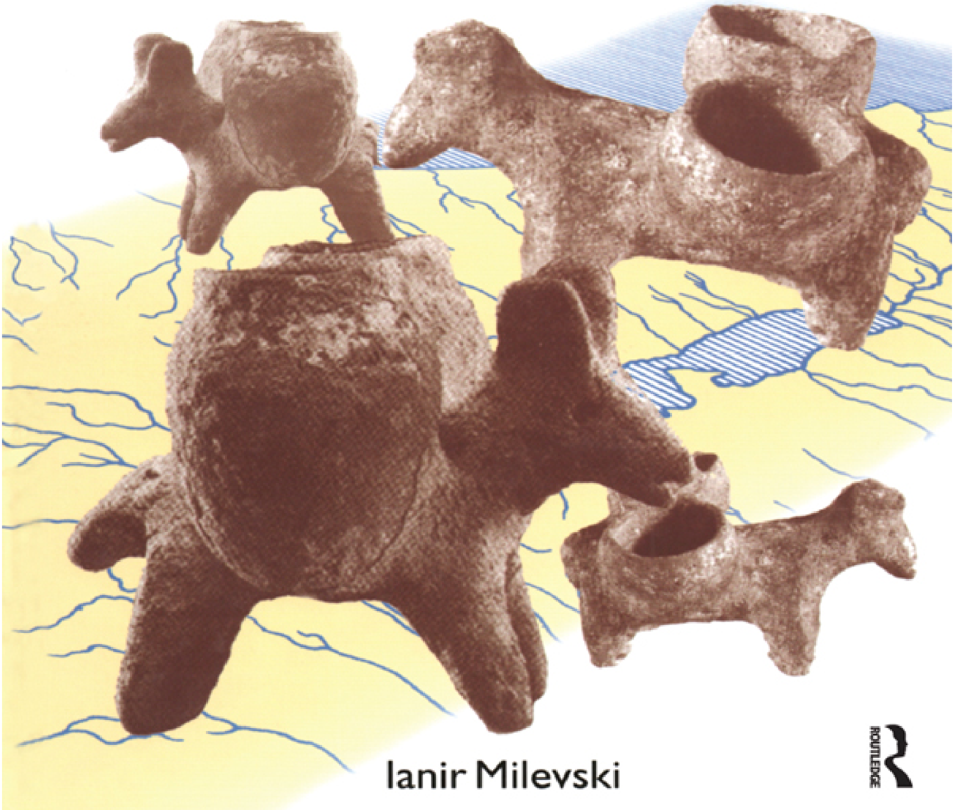
APPROACHES TO ANTHROPOLOGICAL ARCHAEOLOGY

Early Bronze Age Goods Exchange in the Southern Levant

A Marxist Perspective



Ianir Milevski

Early Bronze Age Goods Exchange in the Southern Levant

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TO MY FAMILY

‘The habitants of this country are unusually handsome and large. And they are frank in their dealings, and not mercenary; for they do not in general use coined money, nor do they know any number greater than one hundred, but carry on business by means of barter, and otherwise live an easy-going life. They are also unacquainted with measures and weights…’

(Strabo, *Geography* XI, 4,4)

Contents

Preface

This volume is an upgrading of my Ph.D. dissertation (Milevski 2005), which was carried out under the supervision of Prof. Ram Gophna. Two decades ago, as a teacher at the University of Buenos Aires, I acquired an interest in and lectured on aspects of trade in the ancient Near East. This interest, along with my familiarity with Marxist thought to which I have remained faithful through the years, as well as two decades of field experience as a research archaeologist working mainly on Early Bronze Age (henceforth EB Age) sites, have refined the focus of my investigations. Thus, this work is the result of several years of research on production, exchange, craft specialization and the relationship between art and society in the southern Levant during the EB Age. The subject was chosen because of the opportunity it presented to combine my field experience and the resulting data, with theoretical aspects of society and economy, a major area of interest for many researchers studying the ancient Near East.

In this volume, the theoretical discussions in Part I, Chapter 2 have been expanded for the benefit of readers interested in the discussion of matters related to economic theories and Marxism, as well as other anthropological perspectives on archaeology. Readers who wish to avoid this discussion can find the raw data on EB exchanged goods in Part II, and the description and discussion of networks and means of exchange in Part III.

An explanation of the main elements comprising the economical thought of Karl Marx could not be avoided, nor could it be abbreviated to any significant extent, otherwise the interpretations deriving from the archaeological data base would lack a theoretical base.

Part II has been partially reshaped in order to facilitate comprehension of the data, while avoiding (in most of the cases) meticulous discussions of specific find spots and the stratigraphy of the various exchanged goods (which can be found in my Ph.D. dissertation).

The conclusions in Part IV are, of course, based on the theoretical frameworks presented in Part I and the discussions of the data bases presented in Parts II and III.

This research could not have been completed without the assistance and support of a number of colleagues and friends. I wish to thank Prof. Ram

Gophna who guided me and supported me through all the steps of my Ph.D. with great patience and investment of time. I also wish to express my gratitude to Eliot Braun, colleague and friend, from whom I learned so much concerning the Early Bronze Age of the southern Levant. His English editing of the preliminary draft of this work has made it more intelligible. I am also grateful to my colleagues and friends Ofer Marder, Liora K. Horwitz and Hamoudi Khalaily, who read several chapters of the first draft and made important observations. They were a great source of encouragement for me during the writing of this work. Thomas Levy and the editorial staff of Equinox Publishing were exceptionally kind to accept this manuscript for publication, making fruitful comments to improve its publication and assisting in all the technical aspects of the work.

In addition, this volume has benefited from collaboration with a number of colleagues who shared with me material from their excavations or researches: Yael Abadi, Uzi Ad, the late David Alon, Rina Bankirer, Ran Barkai, Yaakov Baumgarten, Alison Betts, Baruch Brandl, Eliot Braun, Edwin van den Brink, Anat Cohen, Emanuel Eisenberg, Ori Fragman-Sapir, Hermann Genz, Isaac Gilead, Amir Golani, Avi Gopher, Ram Gophna, Yuval Goren, Nigel Goring-Morris, Raphael Greenberg, Alon De Groot, David Ilan, the late Ornit Ilan, Alex Joffe, Thomas Levy, Nili Liphschitz, Ofer Marder, Amihai Mazar, Pierre de Miroschedji, Yonatan Nadelman, Axel Nielsen, Stephen Pfahn, Graham Philip, Naomi Porat, Leslie Quintero, Rivka Rabinovich, Johan Reinhard, Gary Rollefson, Steve Rosen, Yorke Rowan, Thomas Schaub, Michael Sebanne, Gonen Sharon, Roni Shimelmitz, Philip Wilke, Sam Wolff, Eli Yannai, Yuval Yekutieli, Vladimir Zbenovich, Adi Ziv-Esudri and Sharon Zuckerman. In addition, Nili Liphschitz, Naomi Porat and Sariel Shalev were kind enough to share their knowledge of specific issues with me. My thanks are also owed to David Davidson (BAR-Archaeopress), Hillel Geva (Israel Exploration Society), Zeev Hezog (Institute of Archaeology, Tel Aviv University), Penny Wiggins (Council for British Research in the Levant) and Noga Zeevi (Israel Antiquities Authority) for granting me publication permissions.

Thanks are also due to Marisa Lazzari and Alon De Groot, colleagues and friends, who shared with me several conversations on ethnoarchaeological matters. My friend Daniel Gaido was of immense assistance with the discussion on questions related to political economy. He, Sam Wolff and Shelley Sadeh, colleagues and friends, contributed to the editing of this volume. My eldest son, Miki Nuway-Milevski, helped with the set-up of the bibliography. Of course, I am solely responsible for the ideas presented in this work, and the final product.

Last but not least, I wish to express my love and gratitude to the members of my family, and especially to my wife Margalit, whose encouragement and forbearance made this work possible.

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I
RESEARCH FRAMEWORKS

Ten years after the original publication of this book (*A Marxist Archaeology*), archeologists may still ask why we should seriously consider Marxism at this time

(McGuire 2002: vii)

1

Introduction

1. Description of the Subject and Research Objectives

Exchange is the principal means by which goods are circulated and disseminated and as such it is an intermediate phase between production and consumption. The significance of this intercourse has been well recognized, especially in the study of pre- and proto-historic cultures, with entire volumes dedicated to the subject in the fields of Mesoamerican, Aegean-Mediterranean and Mesopotamian archaeology (e.g. Polanyi, Arensberg, and Pearson 1957; Sabloff and Lamberg-Karlovsky 1975; Earle and Ericson 1977; Ericson and Earle 1982; Gale 1991; Oates 1993; Knapp and Cherry 1994). Such studies deal exhaustively with the subject itself *in modo grosso* from a comprehensive theoretical point of view and in its details in diverse regions.

A. Early Bronze Age Economics

The emergence of cities and states during the Bronze Age, and what some authors have labeled ‘complex societies’, have been the subject of numerous studies in the recent past. V Gordon Childe (1936) was one of the pioneers who emphasized the role of craft specialization and trade in what he called the Urban Revolution during the EB Age in Europe and the ancient Near East. The importance of his work (see Chapter 2) must be stressed, even if some his proposals concerning these developments require partial revision (and see Gilman 1996).

Studies on the emergence of cities have focused on what has been called the transition from chiefdoms to states (Earle 1997, 2002). In the southern Levant, the Chalcolithic period has been defined as a society dominated by chiefdoms

(Levy 1995). The EB I is a period of transition to urbanization, which appears during the EB II–III in the form of urbanized agricultural states (Amiran and Gophna 1989; de Miroschedji 1989b; Gophna 1995b).

In other areas of the ancient Near East (mainly Anatolia and Mesopotamia), some interesting conclusions concerning the EB Age have been extracted from the archaeological record and texts. It has been suggested that in the middle of the third millennium BC the production and distribution of goods made of accessible materials previously produced by households or by independent specialists, fell under state control. However, by the end of the third millennium BC, when numerous urban centers were abandoned or considerably reduced both in size and population, and the number of villages increased (Wilkinson 1990:102–3), there may have been a reversion to less centralized production and distribution.

Wattenmaker (1994, 1998), who has studied the processes of specialization among both elite and non-elite groups in early-state societies of southern Anatolia (third millennium BC), points to an increase in sociopolitical complexity. The main results of these developments were that elites were provided with subsistence products by non-elite populations, and specialist-produced goods increased among elite and non-elite groups; the non-elite population continued to be self-sufficient in the production of goods, including certain specialized goods such as pottery, textiles and ornaments.

Gilman (1981), who has researched the development of the Copper (Chalcolithic) and Early Bronze Ages of western Mediterranean Europe, opposes traditional functionalist theories. He views these as reflecting a mistaken belief that large trade networks and resource distribution led to the establishment of a permanent ruling class. Gilman combines several theories concerning the beginnings of social stratification, including the development of irrigation and the trading of luxury goods, which require some sort of hierarchy in order to control labor. Gilman refers to this as ‘capital-intensive subsistence technology’ and he brings as illustration the creation of irrigation systems in the arid parts of Europe around the Mediterranean basin, the time-intensive cultivation of grapes and olives in the Mediterranean region, the construction of large boats and nets for fishing in coastal areas, and the clearing of land for plow-intensive agriculture. Gilman points out that ‘protectors’ established their power over an increasingly ‘capital-intensive people’, and that the increased trade of luxury items and the development of metallurgy in the Bronze Age should be viewed as indicators of a stratified society and not as reasons for the rise of European stratification.

In other parts of the world, Earle (2002:216–18) has utilized the example of the Incan empire to describe the process in Bronze Age economics in which the exchange of prestige goods was replaced by controlled production and circulation of goods by institutionalized groups of power. According to Earle (2002:217), the Incan empire needed to support these new imperial institutions with an elaborate economy and system of finance. A staple finance system with

elaborate warehousing, according to Earle (*idem*), was the first economic model of the Incan empire. While the present study does not intend to fully study EB economics in the southern Levant, its goal is to describe and analyze an important aspect of the EB economy—local exchange.

B. Exchange in the Southern Levant

Most studies on exchange in the ancient southern Levant have dealt with historical periods, while neglecting earlier evidence. There have been detailed studies of exchange/trade in the Levantine Middle Bronze (hereafter MB) and Late Bronze (hereafter LB) Ages that have dealt with local and external trade (e.g. Liverani 1975; Na'aman 1981; Bietak 2002; Maeir 2000; Marcus 2002a) within the context of a system of circulation of goods between sites and regions, but the subject has not been fully addressed for these periods. Iron Age studies of exchange have primarily centered on Biblical texts (e.g. Barnett 1969; Elat 1979; King 1999) with little regard for archaeological sources.

Studies dealing with trade and exchange in the southern Levant during the EB Age have tended to concentrate on external relations, especially those associated with contacts with Egypt (e.g. Ben-Dor 1937; Ward 1963, 1991; Hennessy 1967; Ben-Tor 1986, 1990, 1991a; Gophna 1987; van den Brink and Braun 2002). Studies of localized, internal south Levantine exchange has hitherto tended to be limited in scope, dealing with aspects related to particular finds or restricted to regions of small size (e.g. Rosen 1983a,b,c; 1997a; Ilan and Sebbane 1989; Esse 1982,1989a,b, 1991; Esse and Hopke 1986). The aim of this work is to ameliorate the present situation by providing an overall view of exchange for the period under discussion.

C. Sources

Excavations and surveys of EB sites have greatly increased our overall understanding of the typology of archaeological finds, of chronological and regional sequences, and settlement patterns (Ben-Tor 1968, 1978; Gophna 1974, 1984; Kempinski 1979; Gophna and Portugali 1988; Beck 1985, 1995; de Miroschedji 1989a; Amiran and Gophna 1989, 1992; Esse 1991; Dessel 1991; Braun 1991; Yekutieli 1992; Stager 1992; Joffe 1993; Finkelstein and Gophna 1993; Greenberg 1996a, 2002). Especially within the last decade major excavation reports and collective works on EB society with particular emphasis on pottery have been published (e.g. Biran, Ilan and Greenberg 1996; Braun 1996b, 1997; Finkelstein, Ussishkin and Halpern 2000; Kochavi, Beck and Yadin 2000; Philip and Baird 2000; Wolff 2001; Eisenberg, Gopher and Greenberg 2001; Getzov, Paz, and Gophna 2001; van den Brink and Yannai 2002; Greenberg 2002; Kempinski 2002; van den Brink and Levy 2002; Ussishkin 2004). The present study is based on these major works and additional studies.

D. Chronological and Geographical Limits of this Study

The focus of this research is local exchange in the southern Levant during the EB Age, primarily at sites west of the Jordan River; internal regions are depicted in Figure 1.1 (see Chapter 11). Northern regions are: (1) Upper Galilee, (2) Huleh Valley, (3) Western Galilee, (4) Lower Galilee, (5) Golan, (6) Jezreel Valley. Central regions are: (7) Central Coastal Plain, (8) Jordan Valley, (9) Central Hill Country, (10) Shepehelah, (11) Southern Coastal Plain. Southern Regions are: (12) Northern Negev, (13) Dead Sea Plain, (14) Aravah (15) Central Negev, (16) Southern Negev.

The Intermediate Bronze Age (henceforth IBA), identified by some scholars as EB IV, i.e. an integral part of the EB Age, will not be addressed here due to its unique characteristics which, in this writer's mind, differentiate it from the EB I–III. Elsewhere (Milevski 2005), the term Canaan was used interchangeably with southern Levant with full cognizance that the geographical, chronological and cultural implications of this are a matter of scholarly controversy (e.g. Rainey 1996). Here we will use the term southern Levant.

Since this study is primarily focused on localized exchange, exchange mechanisms with neighboring regions are dealt with only when directly related to local exchange. While this research focuses mainly on the area west of the Jordan River, for which there is abundant available evidence, some Transjordanian sites are also included when evidence indicates they are part of the local exchange mechanisms.

Given that there are several, and sometimes conflicting, nomenclatures for the chronology of the EB Age, specific terms have been adopted in this work from other scholars that represent this writer's understanding of the periodization of the era. A clear cultural dichotomy between the north and south of the southern Levant during EB I is acknowledged in this work. For EB I in the south, the chronological divisions of Yekutieli (1992, 2000), in combination with those of Gophna (1995b, revised from Amiran and Gophna 1992), are followed. When necessary, phase within the period are referred to, such as EB IA (or early EB I) and EB IB (or late EB I) (Table 1.1).

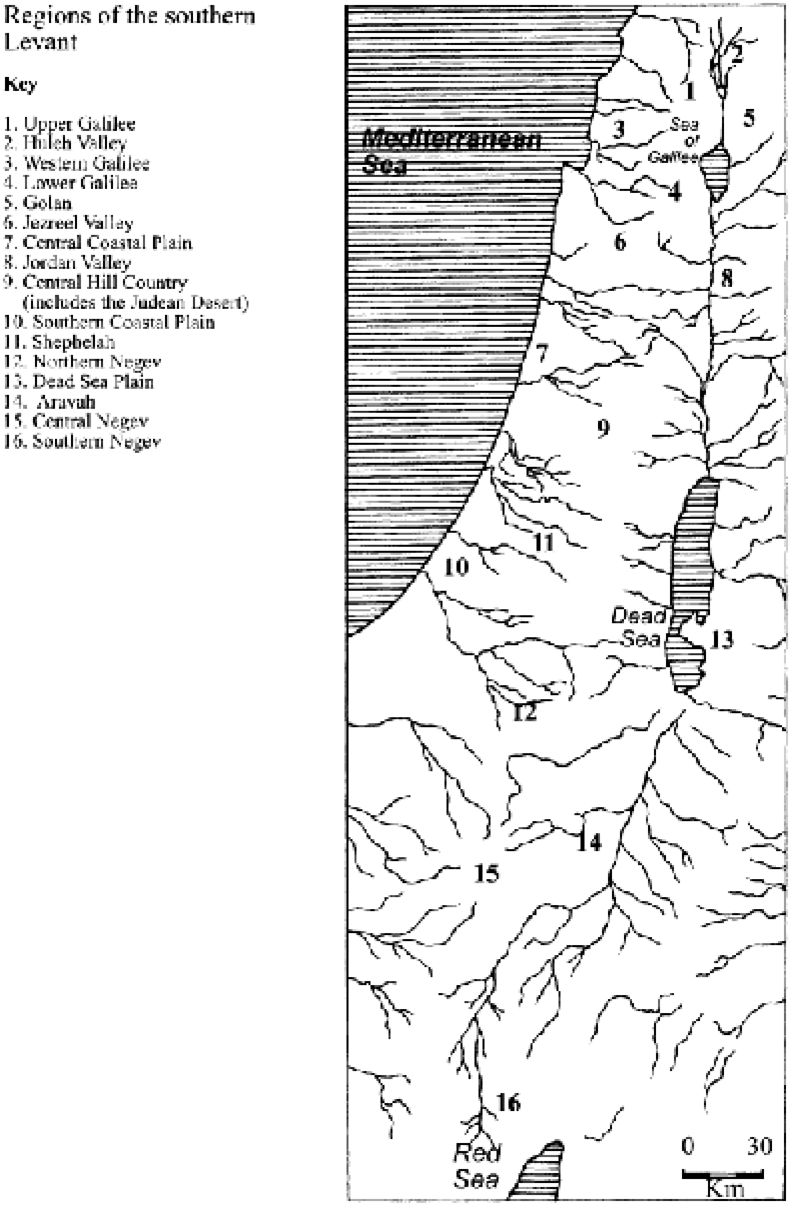


Figure 1.1 Regions of the southern Levant.

Table 1.1 Chronology of the Early Bronze Age in the southern Levant.

Period	*Years BC*
EB IA	3600–3300
EB IB	3300–2950
EB II	2950–2600
EB III	2600–2300

For EB I in the north, the division into two phases, as defined by Braun (1996b: 175–84), is less clear. The chronological division is generally based on types of Gray Burnished Ware, with Types I and II associated with EB IA/early EB I, and Types III and IV associated with EB IB/late EB I (and see Chapter 3). Braun (in press) suggests that there is yet a third, post-Gray Burnished Ware phase of Late EB I, represented, for example, at the site of En Shadud (Braun 1985).

East of the Jordan River there are difficulties in synchronizing southern sites such as Bab edh-Dhra and Wadi Feinan with their southwestern counterparts (for a discussion see Braun 1996b: 187; Genz 1997), and so for them, the simple label EB I must suffice, without specific periodization.

Radiocarbon dates (Braun 1996b: 156–63; 2001) provide a general absolute chronological framework, but it should be noted that there are some major problems with them, especially concerning the EB I (e.g. Braun and Gophna 2004; Golani 2004). For EB II and III, Amiran and Gophna (1989) and Getzov, Paz and Gophna (2001:14–21) present a chronological framework for discussion. Although internal divisions of EB II and III were discussed by Callaway (1978), Seger (1989) and de Miroschedji (1999, 2000b), they will only be referred to when they apply to specific discussions such as that related to Khirbet Kerak Ware.

E. Terminology

The study considers first a theoretical framework by offering explanations of basic terms of reference. These terms will then be used to investigate the archaeological record of the EB, explain and interpret it. Observations are based on theoretical approaches found in the economic, anthropological and archaeological literature (see Chapter 2; for seminal approaches to this subject see the works by Stjernquist [1966], Sabloff and Lamberg-Karlovsky [1975], Earle and Ericson [1977], Kohl [1981], Ericson and Earle [1982], Spriggs [1984], and Renfrew and Bahn [1994:307–38, 405–36]).

The term ‘exchange’ instead of ‘trade’ in this work is in need of explanation and justification. The etymology of the word ‘trade’ offered by Adams (1974:141–2) shows that the meaning of this expression has a history related to ‘travel’ trough the word ‘tread’—’path’ or ‘beaten track’ in Old English and German. In two modern dictionaries, for instance, the following definitions are given:

> Trade: The act or business of exchanging commodities for other commodities or for money; the business of buying and selling; commerce

or

> buying and selling of goods, exchange of goods for money or other goods,[1]

and

> exchange: The act of giving one thing or commodity for another; barter; trade; the act of parting with something in return for an equivalent.[2]

While there may be some minor differences between the concepts of exchange and trade, they are not always clear. This work follows the critical approach to political economy applied by Karl Marx (1970[1859], 1977a[1867], 1977b[1894], 1993 [1939]), wherein exchange refers only to commodities paid for in kind, with no money or other exchange-medium in use (and see Chapter 2). This form of exchange is sometimes called barter. It should be stressed that standard weights (related to media of exchange) are also not associated with EB Age material culture, and as far as is known to date, they appear in the southern Levant only from the MB Age onwards (Stern 1971; Meshorer and Reich 1998; Kletter 1998).

Although we do not possess archaeological information proving that exchange-values existed during the EB Age in the southern Levant, this does not mean that commodities did not have equivalent values when exchanged for one another. Absence of evidence, however, is not always evidence of absence (Gamble 2001:116). In any case, we could ascertain the values of EB goods based on their known values in other regions of the ancient Near East during subsequent periods (and see Chapter 2).

It is assumed that nominal exchange-values did exist and may well have led to specialized objects that came into use in the period following the EB Age to fulfill this once nominal function. Meshorer (1976) has suggested that metal bars (sometimes identified as ingots) found in IBA sites of the Negev (e.g. Cohen 1999:figs. 115–16), may actually represent a specialized medium of exchange. If so, then they would represent, so far as is understood from the archaeological record, the earliest evidence from the southern Levant. The earliest historical sources of information regarding such a medium of exchange from the region date to the MB (Ben-Tor 1992; Horowitz and Schaffer 1992; Horowitz, Oshima and Sanders 2006) and LB Ages (Moran 1992). Biblical sources suggest continued use of such media. Coinage, as a much more highly developed medium of exchange, first appears in the southern Levant in the Persian period during the sixth-fourth centuries BC (Meshorer 1982). Until that period the economy in the southern Levant was based on weight-measure standards (cf. Kletter 1998, 2003, 2004; contra Gitin and Golani 2004).

By contrast, there is evidence from Ebla and Ur III of two types of exchange existing as early as the middle of the third millennium BC. One of them is called barter (baratto) by Pettinato (1979:178–80), translated from the expression in Ebla *šu-bala-aka* as 'to transmit from hand to hand'. In that type of exchange metals (mainly silver) are the bases for exchange-values, although *de facto*, they are not really utilized. The second type of exchange is called 'buying and selling' (compravendita) in which the word *ni-šam*$_x$ is translated as a 'price' (prezzo) that appears in transactions (Pettinato 1979:180–4). This work favors

the translation of this expression as 'exchange-value', since price is the result of other components that influence in an economy related to production of commodities (see note 1). In this second type of exchange a specialized medium is utilized, one generally expressed apparently, *de facto*, in quantities of silver.

Widell (2005) also divided the exchange at Ur III into two economic spheres according to the written sources of the period. On the one hand, a large-scale exchange system that took place on an institutional level using silver, on the other hand, small-scale barter on a local level. According to this author, based also in Steinkeller (1989:118–20), only 30% of the documents record the connection between buyers and sellers, indicating that a significant proportion of the large-scale sales in this particular period may have conducted outside the sphere of the great institutions (temple or palace). The term *ku3–bi* 'its silver (value)' is understood as 'exchange-value'.

Unfortunately, for the southern Levant there are no documents to indicate the terminology utilized during the EB Age to suggest special terms for trade and exchange. Some expressions in Biblical Hebrew and other ancient Semitic languages associate words for trade, exchange and merchants with the verbs 'to change' and 'to travel'.

In Eblaitic texts merchants are labeled as 'messengers' *kas4* and commercially initiated journeys as ni-*kas4*. In Biblical Hebrew the words that mean trade or exchange (מסחר, *msḥr*), merchant (סוחר, , *swhr*) and commodity (סחורה,, *sḥwrh*) have a common root—סחר (*sḥr*), 'to go around, to travel' (Brown, Driver and Briggs 1979:694–5). Another world related to merchants is רגל (*rgl*) connected with the root רגל, to go and foot (*idem*, 920). Of course these words derive from a later period, the Iron Age II. Exchange-media and values of commodities are found in Biblical texts. In addition, another root מכר (*mkr*) means 'to sell' and from it is derived the word מכר ,מֶכֶר, 'commodity' or 'merchandise' and 'value' or 'price' (Brown, Driver and Briggs 1979:569). The word מחיר (*mḥyr*) is also utilized for 'price' a word borrowed from Akkadian *mahirum* (*idem*, 564). In Jewish Aramaic מחיר is utilized for equivalent, or counter-value of a gift in goods (Hoftijzer and Jongeling 1995:613), while מכר is derived from Akkadian *tamkāru* 'merchant' (Sumerian *dam-gàr*, von Soden 1981:1314–15). The Ugaritic word *mkr* is the term used for merchant (pl. *mkrm*) distinguished from *bdlm* (Gordon 1965:371, 433). This last word is derived from the Semitic root 'to exchange' as in Arabic بدل (*bdl*) (Lane 1863:167–8). The same root appears in several instances in Akkadian where *bi-da-lu-ma*, i.e. 'merchants' are equated to *tamkāru.* In Ugaritic *mkr* is also the root of the verb 'to travel' and in Aramaic, Punic and in the Dead Sea scrolls it has several meanings: 'to sell', 'merchant' and 'trader' (Jean and Hoftijzer 1965:150; Hoftijzer and Jongeling 1995:625–6). The root *shr* was also employed (Jean and Hoftijzer 1965:192; Hoftijzer and Jongeling 1995:782–3) in the same body of literature. In Biblical Hebrew the root for change and exchange is חלף (Brown, Driver and Briggs 1979:322). However, the only passage where this term is used appears in a text probably

dating from the Persian period (Num. 18:31) wherein the tenth of the tenth is given to the Levites as חֵלֶק, i.e. as compensation for their work.

In this work the term ‘exchange’ is used to describe all inter-site giving and receiving of commodities. The expression ‘commodity’ refers to all goods that have a use-value and an exchange-value (and see Chapter 2). Exchanged commodities may be simple functional objects such as pottery, flint artifacts, foodstuffs, raw materials (i.e. useful minerals), or precious commodities with prestige or ceremonial use-value. The fact that commodity exchanges could also have been gift-exchanges or competitive-exchanges, in order to establish alliances or settle rivalries (Dalton 1977), does not change the economic character of the exchange of goods.

F. Aims

The aims of this study are to identify the main commodities exchanged during the EB Age and, when possible, to pinpoint their sources. This work attempts to plot patterns of their movement between archaeological sites and to by doing so to trace likely links and circuits between sites and regions. It also attempts to periodize the links identified within the EB Age, according to geographical areas. It further attempts to define the types of exchange relations according to available data.

More generally, the primary object of this study was to test archaeological theory through application of data derived from the field. To date, most archaeological research in the southern Levant has focused on taxonomy of artifacts, architecture, and burial practices through time and space. The present study attempts, by observing the most accurate data available, to go beyond mere description and interpret the archaeological record. The justification for this treatment is found in a statement made by Edward H. Carr (1961: 8) who once pointed that for the study of history, ‘accuracy is a duty, not a virtue’. This writer feels it is no less a binding need for the prehistorian.

Such an approach entails a somewhat lengthy and tedious description of data. In this work (as opposed to the Ph.D. dissertation that preceded it), we have tried to simplify the presentation. Fortunately, little new data has been published since 2005.

Although this study aims at precision regarding both quality and quantity of data, it should be noted that sources are many and varied and data may be of uneven reliability or even dubious *bona fides.* While such problems may affect this work, it is felt that they are common to all archaeological research and thus, unavoidable. To what extent they may have biased the results is unclear, but this writer believes that, given the present state of knowledge available, this study offers at least a reasonably good general picture on local exchange, not just for one specific geographic region of the southern Levant, nor for a specific commodity for a relatively short span of time, but rather for many types of commodities over the entire region and for the entire length of the EB

Age.

Establishing patterns of exchange will help towards an understanding of social interactions, regional variances, and diachronic changes in patterns, reflecting historic changes in the area. The author of this work is convinced that the task of seeing these relations through the archaeological record, while arduous and dependent on many variables of uncertain reliability, is, nevertheless, achievable. At the same time, the database of major EB commodities organized in this work, it is hoped, will be helpful as a starting point for further research.

The conclusions proposed in this work on local exchange are also meant to augment interpretations of the economic pre- and proto-history of the southern Levant and other regions of the world. It is further hoped they will become a basis for further discussion among scholars of economic history who may be able to benefit from gaining a perspective on a 'history without written sources'.[3]

G. Frameworks

The discussion on exchange goods and patterns is realized within two main frameworks: (1) typological, chronological and regional settings in which this research is done, and (2) a theoretical background against which the subject is discussed. This theoretical background primarily includes economic and anthropological approaches that sometimes cannot be differentiated one from another based on archaeological data, all of them under a Marxist perspective (McGuire 2002:3–4).

Consequently, although the study of prehistoric exchange has been approached from different points of view, the main interpretation is still based on archaeological data. For instance, history, anthropology and economics study the same phenomena, and if one of these disciplines perceives one aspect of reality, the resulting image is partial if not completed by other disciplines. However, the conversion of an abstract into a concrete picture, e.g. a given network pattern derived from the finding of pottery or flint artifacts at several sites, cannot be achieved by adding up several partial images. Knowledge of past human behavior cannot be achieved solely by combining field archaeological results with sociological or anthropological theories. Concrete knowledge does not result from mere addition but rather derives from a synthesis of concepts elaborated with the aid of sociological and anthropological disciplines (see Goldmann 1952:9).

H. Steps of Research

Section 2 of Chapter 1 offers the reader a general review of previous works on exchange in the southern Levant. Chapter 2 presents a theoretical framework based on approaches to exchange derived from anthropological models.

This part of the research investigated the whole process of exchange of commodities, with particular attention paid to their production and circulation. Groups of commodities such as identifiable pottery types or wares, flint and stone tools, shells, raw materials are recognized, defined and discussed, the result of intensive investigation of finds, site by site and then across regions and periods. Once these groups were defined typologically, chronologically, and regionally, the next phase was to establish their provenance. The results offer what appears to be a comprehensive picture of these groups of commodities and the socio-economic relations and exchange patterns evident from them.

Investigation of distribution patterns in order to identify regional and temporal facets and stages allowed production of maps according to types of products and periods (Part II). These maps and plans attempt to: (1) compare the distribution of each commodity according to periods, regions and sites; (2) analyze each region according to commodities by period; (3) examine distribution of commodities between different regions; (4) reconstruct exchange relations between regions and sites and extrapolate that information in order to reconstruct socio-economic links behind the interchange of goods.

In Part III, Chapter 10 we study the use of the donkey as a beast of burden for transportation of commodities and an iconographic expression of related activities likely to be associated with social groups involved in exchange. Data on archaeozoological remains are presented along with a discussion on domestication and use of donkeys and possibly other equids. Another discussion considers the iconography and distribution of the donkey figurines.

Part III, Chapter 11 offers conclusions on characteristics of EB Age networks of exchange by region and on the EB economy and society in the light of the research.

Part IV presents the general conclusions of the work and the perspectives of future researches.

I. Sources Utilized

Sources upon which this research is based are mainly published stratigraphic excavation reports and unpublished accessible collections of archaeological finds. When important, in some specific cases, surveys are utilized to complement the sources (for limitations of surveys on researches of this type see Ammerman 1981; Flannery 1974:131–60; Renfrew and Bahn 1994:61–9).

Unpublished sources from excavated sites are used to complement primary data obtained from excavations, when available. That material comes mainly from this writer's work and that of colleagues who have kindly allowed its use in this research. In some instances the writer participated in excavations as assistant or field supervisor for the Israel Antiquities Authority (IAA henceforth).

It should be emphasized, as in all archaeological research of this kind, that

work is based only on a surviving sample of what once existed, a sample that is not necessarily representative of the parameters of the study. Data from excavated sites are considered most reliable since we know the archaeological contexts in which they were found. However an amount of information is missing from non-excavated sites. Since distribution patterns derived only from excavated sites, they do not necessarily represent all evidence for settlements in a given region. The present work does not purport to present a complete picture of local exchange in the southern Levant during the EB Age. It is likely that with increments in knowledge, more accurate researches will be forthcoming in the future.

To reconstruct likely sources of pottery, petrographic data are essential. They present results of microscopic examination of thin sections of pottery, i.e. petrographic results which reveal the evidence regarding the distribution of materials from geological sources (Porat 1989a,b; Goren and Porat 1989; Goren 1991, 1996b) that indicate geographic regions in which pottery production is likely to have taken place.

Other methods generally used include trace-element analysis, mainly neutron activation analysis (NAA) (Perlman and Asaro 1969), atomic absorption spectometry (AAS), X-ray fluorescence spectometry (XRF), inductively coupled plasma-atomic emission spectrometry (ICP-AES), proton-induced X-ray emission (PIXE), and proton-induced gamma-ray emission (PIGME)(Knapp 1987; Yellin 2007). These trace-element methods provide tables of chemical elements, and the problem is how to interpret them. In the case of pottery, different sources can have similar compositions, which can result in misleading results. Petrographic methods are much more satisfactory, and less expensive. Trace-element analysis, however, can be more effective in distinguishing between sources near one another (Goren and Porat 1989; Renfrew and Bahn 1994:317–18; Tite 1999).

In some notable instances questions related to production and exchange of commodities and parallels from ethnographic sources related to the subject of study are included in studies. As observed by Esse (1989b:86), we are dealing here with what Rice (1984:45) called ‘micro-provenancing’ studies for pottery, i.e. the making and distribution of commodities within a limited, highly localized area. While micro-provenancing studies refer mostly to objects found within rather limited areas, it should be noted that the extension of exchange distances is a relative concept, dependent upon geographical and historical conditions (Tite 1999).

Data presented in this study do not include all finds associated with the EB Age in the southern Levant, but rather are specific ones chosen for their ability to provide information on the subject of research. This study further considers that the investigation of manufacture and exchange of commodities is subject to a set of variables. Following van der Leeuw (1977, 1988) and Arnold (1985),[4] who used several ethnographical descriptions and studied technology of ancient pottery, these variables can be simply stated for ceramic other non-

ceramic archaeological commodities as follows:

1. Correct identification of the kind of commodity at an archaeological site (for instance hand-made pottery, pottery made on a small turntable, or pottery made on a potter's wheel, etc.).
2. Identification of the level of production at a site (household production, workshop/village manufacture, large scale production, etc.).
3. Correct identification of ceramic groups and types of other finds within a site and throughout a region.
4. Accurate use of sourcing studies and their application to distribution maps.
5. Use of accurate descriptions of ethnographic and ethnohistorical data.
6. Application of archaeological data to comparable ethnographic situations.

Previous Research

A. Exchange in the Southern Levant

Earlier, the importance of exchange and trade studies in early societies in the realms of Central American, Aegean, and Mesopotamian archaeology was noted. For the southern Levant there have been a number of treatments of evidence of earlier than EB Age prehistoric trade routes and exchange. They have discussed information on commodities such as flint (e.g. Rosen 1997b), obsidian (Perlman and Yellin 1980; Yellin, Levy and Rowan 1996), basalt (Weinstein-Evron *et al.* 1995, 1999, 2001), ochre (Zackheim 1997), and shells (Bar-Yosef Mayer 1999a).

As noted above, for the EB Age a number of scholars have investigated the subject of international relations, i.e. relations between the southern Levant and areas bordering and beyond (e.g. Henessy 1967; Ben-Tor 1968, 1990; Andelkovic 1995). An article by Harrison (1993) has developed, on a fairly limited scale, according to the nature of the work, several theories concerning the character of trade with Egypt, and the way in which commodities circulated within Canaan. This article was mainly based on the theoretical work of Renfrew (1975, 1977).

B. Regional Studies, Trade and Urbanization

A number of scholars have dealt with exchange and trade in the southern Levant for the EB Age. One of the earliest treatments is in a work by Esse (1991:99–125) on Beth Yerah. It considered trade as understood from evidence in the northern region of the southern Levant, treating it at regional, interregional and international levels. Schaub (1987) published results of research dealing with the role of ceramic vessels as evidence for trade during the EB in Transjordan.

Other scholars have offered studies relating regional, social and urban inquiries to trade and exchange. Joffe's (1993) research was a major attempt at trying to understand exchange processes within what he calls complex or semi-complex societies. Previously, Rosen (1986) analyzed the relation of trade and craft specialization already in the Chalcolithic period. The role of trade and exchange in urbanization during EB I, was first examined by Kempinski (1989a) and Esse (1982, 1989a,b), and recently was re-examined for the IBA by Haiman (1996). Haiman maintains that the emergence of settlements in the desert during that period is primarily related to the transport of copper from Jordan to Egypt.

Finkelstein and Gophna (1993) have drawn attention to the phenomenon related to the trade of agricultural products. Based on Mesoamerican and Iranian examples (Rathje 1971, 1972; Wright and Johnson 1975) they point out that the demand in Egypt for Canaanean goods accelerated the expansion settlement in the Hill Country and produced the development of marketing stations in the south, as well as the development of social and political stratification in the southern Levant. This relationship between Egyptian trade, settlement growth and urbanization in EB I–II has been the subject of several works (e.g. Gophna 1987; Kempinski 1992; Milevski 1993).

C. Pottery Sources and Centers of Production

Several works have been done in the last years on pottery sourcing that allow us to partially reconstruct some of the main networks of ceramic distribution. These studies deal with Gray Burnished Ware (Goren and Zuckerman 2000), which presents a picture of pottery sources of this group of the EB I.

For EB II–III, Greenberg and Porat (1996), Esse and Hopke (1986) and Mazar, Ziv-Esudri, Cohen-Weinberger (2000), and Zuckerman, Ziv-Esudri and Cohen-Weinberger (2009) have made substantial contributions by studying northern production centers of Metallic Ware and Khirbet Kerak Ware and their relationships to site provenance and distribution. Porat (1989a,b) has contributed to the understanding of southern pottery trade with the analysis of pottery wares from the Negev, Sinai and Egypt.[5]

Work on later periods has yielded similar results. For the IBA, an important contribution to our subject, while in the restricted areas were made by Falconer (1987) and Goren (1996a). For later periods, we have the skillful work by Adan-Bayewitz (1993) on local trade of Roman pottery in the Galilee.

D. Basalt, Flint and Other Materials

Basalt and similar looking stones were favorite materials for stone working in the Chalcolithic and EB periods. It is likely they were made in specific regions where the raw material was found and then exchanged. Scholars have made attempts at locating sources of production and have tried to trace patterns of exchange.

Amiran and Porat (1984) conducted petrographic studies on a limited quantity of basalt bowls of the Chalcolithic and EB I periods and noted the restrictions of petrography in the identification of basalt sources. Goren's work (1991b) on phosphorite vessels of the Chalcolithic period sheds light on a different industry noting circuits of distribution of similar basalt and phosphorite bowls (but see Gilead 1995:314–21). More recent work has investigated south Levantine sources of basalt found as temper in Chalcolithic and EB I vessels have been investigated using XRF analyses by Philip and Williams-Thorpe (1993, 2000, 2001), with relatively good results. Rowan (1998) has undertaken a research on basalt vessels of the EB I, based on ICP-AES methods.

Flint sources and provenances are very difficult to establish by applying trace-element analysis, because the material tends to be non-homogeneous. Frachtenberg and Yellin (1992) attempted to investigate sources of flint from some prehistoric periods, but their results do not seem convincing. Some evidence of sources comes from discovery of flint quarries and areas of sourcing and production of tabular scrapers (e.g. Quintero, Wilke and Rollefson 2002), but in general, information as to sources of flint used for production and distribution of tools is scarce.

Rosen (1983a,b) has made an important contribution to the subject of flint tool distribution during the EB Age, while attempting to establish existence of production centers for Canaanean blades and tabular scrapers, a distribution net for them, and a model for dispersion of material culture. In a comprehensive handbook on post-Neolithic industries Rosen (1997a) has researched relations between organization of the production of tools and their distribution in late prehistoric, protohistoric and early historic times. Of particular interest to this study is a section on the EB Age.

Exchange of raw materials such as bitumen has received some attention, mainly in relation with export to Egypt (Connan, Nissenbaum and Dessort 1992; Milevski 1993). This material has, as well, been discussed as a product of local exchange, likely deriving from the Dead Sea (Nissenbaum, Serban, Amiran and Ilan 1984; Marder, Braun and Milevski 1995; Milevski, Marder and Goring-Morris 2002). Other archaeological materials, such as animal bones, shells and ivory are dealt with less frequently (e.g. Caubet and Poplin 1995; Bar-Yosef Mayer 1999a,b; Hesse and Wapnish 2001).

E. Means of Transport and Routes

Relatively little work has been done on the actual logistics of exchange concerning means of transport and routes through which it was accomplished. Amiran (1985), Haiman (1996), and Greenberg and Porat (1996) have, in different works, pointed out, the importance of donkey caravans in the local and external trade based on their interpretation of objects they believe to be of artistic and cultic importance. As far as is known, there are no representations or archaeological records of traders or middlemen for the EB Age beyond the evidence of animal bones and the few examples of figurines. For further information it is necessary to look at ethno-archaeological sources (see, for example, Arnold 1985, Wood 1990) and a later depiction of what may reflect EB Age practices. That information comes from a tomb at Beni Hasan of the 19th century BC Egypt (Newberry 1893:Pl. XXXI) in which apparently traveling metal-workers (Albright 1960:207–8) or Asiatic merchants (Shea 1981) are depicted with their loaded donkeys.

Pottery containers with their special characteristics are likely to have been used widely for the exchange of specific commodities. Schaub (1996) has suggested pottery vessels as containers of agricultural commodities and McGovern and others (1997) have published results of wine residues from EB Canaanite storage jars found in Egypt. Greenberg and Porat suggested donkey figurines could illustrate the manner in which these vessels were transported (Greenberg and Porat 1996:10, Greenberg 1996b: 139). Faunal collections often contain bones that may not be identified to the degree of genus and species but which can only be classified generally. Several times the presence of donkeys can be confirmed (e.g. Horwitz and Tchernov 1989; Horwitz, Hellwing and Tchernov 1996), but there are numerous instances when bones may only be classified as equids and for which no further definition is possible. While they could be interpreted as evidence for existence of beasts of burden involved in exchange or trade, as at Arad (Lernau 1978:85–6), Tel Halif (Zeder 1990), Tel Dalit (Horwitz, Hellwing, and Tchernov 1996), and Tel Kinrot (Hellwing 1988–9; Ovadia 1992; Grigson 1995), yet another interpretation suggested equid remains could also be interpreted as horses used for plowing (Grigson 1993).

As far as we know, little research has been done on local routes and roads during the EB (a brief mention is made on the region between the coastal plain and Jerusalem in a work on Roman roads by Fischer, Benjamin and Roll [1996]), and most of the studies are related to international trade (e.g. Oren 1973, 1989). Gophna and Liphschitz (1996) and Galili *et al.* (2002), have put forward evidence of maritime trade along the Mediterranean coast, from Lebanon to Upper Egypt and from Egypt to the Levantine coast based on information derived from some archaeobotanical and mollusca remains. Wood and other botanical remains can also be interpreted as inter-regional exchange within the southern Levant, and for trade with other regions beyond (e.g. Lev-Yadun and Gophna 1992). That has been the thrust of work on the EB Age by a number of scholars (e.g. Liphschitz 1986; 1992; 1996a,b; 2000a,b; Gophna,

Liphschitz and Lev-Yadun 1986–7).

Notes

1. *Webster's New Twentieth Century Dictionary of the English Language* (Unabridged; Second Edition 1961). New York.
2. *Oxford Advanced Learner's Dictionary of Current English.* (Revised and Updated 1982). Oxford.
3. Ben-Tor (1990: 3) has addressed problems that scholars must deal with when trying to research the subject of exchange while lacking written sources.
4. See also Franken 1974; Franken and Kaisbeek 1975; van der Leeuw 1976; Esse 1989b; Goren 1991a.
5. Unfortunately, we only recently learned of the Ph.D. dissertation of Paz (2003) on Golanian pottery types that reached the Galilee during the EB II.

2

Theoretical Frameworks

1. General Approaches to Prehistoric Exchange

Recent decades have seen a spate of studies dealing with production and exchange in prehistoric times throughout the world. However, specialists in Levantine archaeology have been reluctant to define production and exchange within a theoretical framework (see Knapp and Cherry 1994:123–4 for a generalized discussion of this issue).

While an all-embracing archaeological study of theories of production and exchange is beyond the scope of this volume, in this chapter we will briefly review the most important scholarly works. A detailed appraisal of these theories can be found in the works of Adams (1974), Trigger (1989), Renfrew and Bahn (1994), Knapp and Cherry (1994) and Earle (2002).

Two alternative, contrasting approaches to the subject are prominent in the literature of prehistoric and protohistoric exchange. One, known as 'substantivism', has been championed by a number of scholars (e.g. Dalton 1965, 1977; Renfrew 1975, 1977), who maintain that different societies organize their economic activities–exchange in different ways. Following this approach, Polanyi, Arensberg and Pearson (1957) have defined three modes of exchange in ancient societies: reciprocity, redistribution and market. Some scholars, including Dalton, have emphasized the functionalist aspect of substantivism, while Sahlins (1972) and Service (1975) have re-interpreted Polanyi in an evolutionary mode.

A second approach, known as 'formalism' points out that all societies display certain common economic characteristics that center on the behavioral principle of 'choice' (Binford 1982). For these scholars (e.g. Burling 1962; Cook 1966), exchange patterns are the result of a combination of fixed sets of

interacting variables, all of them imbedded in general and non-changing patterns of human behavior.

In addition to these two main approaches, other scholars have interpreted trade and exchange in prehistoric societies as 'processual' (e.g., Knapp and Stech 1985; Renfrew and Cherry 1986), or 'post-processual' (Knapp 1993), following a terminology developed in recent decades in America and Europe. Others have preferred to discuss the subject using general anthropological approaches, e.g., 'world systems theory' (Rowlands, Larsen and Kristiansen 1987), structuralism or contextualism (Hodder 1982a, 1986; Tilley 1990), or structuralism adapted to Marxism (Patterson and Galley 1987) (and see below).

More recently, scholars of prehistoric trade and exchange have become divided between those who follow Weberian notions on the centrality of production in economy (mainly agricultural production [Weber 1961]), and those that support the Sombartian approach (Sombart 1967), an interpretation that stresses the idea of 'conspicuous consumption' (see Veblen 1912). While Weberians (e.g. Weiner 1991) place emphasis on the supply side of economy as the main factor of exchange, Sombartians have emphasized the role of demand and consumption (e.g. Sherratt and Sherratt 1991).

In the following section, we define the premises upon which this work is based and attempt to offer a clearer understanding of prehistoric exchange based on Marxist theories of political economy. This approach falls within what Brumfiel and Earle (1987) define as 'commercial development' or, as classified by Knapp and Cherry (1994:126), 'social' models of production and exchange'. The author of this volume prefers, as Karl Marx did, to call it a 'critique of political economy' or a 'materialistic, dialectic perspective'; however, for the simplicity of this discussion, we will call it a Marxist perspective of archaeology, as coined by Spriggs (1984:3) and we will avoid the term 'Marxist archaeology'.

As opposed to most Marxist approaches to archaeology, the approximation of the critique of political economy in this volume does not derive from anthropological explanations of Marx, but from the writings of Marx and Engels on the economic development of ancient societies, the production of commodities and the theory of value (and see Preucel and Hodder 1996:99–100).

2. Marxism and Marxist Perspectives in Archaeology

A. Marxism and Archaeology

Marxist perspectives of archaeology (and see below) have been analyzed by several authors (e.g. Spriggs 1984; Trigger 1989:207–43; Hodder 1986:55–76; Renfrew and Bahn 1994: 412–15; McGuire 2002).

Marxist or Marxist-orientated interpretations in archaeology have been in use

since the beginning of the 20th century, although V Gordon Childe was the first proponent of these theories to gain renown (Trigger 1987). His views on production and exchange in prehistoric times were a brillant application of the the theories of Karl Marx to archaeology as a branch of anthropology (and see below).

Interestingly, Marx (1977a:286) made the following statement revealing an archaeological view of social development:

> Relics of by-gone instruments of labor possess the same importance for the investigation of extinct economical forms of society, as do fossils bones for the determination of extinct species of animals. It is not the articles made, but how they are made, and by what instruments, that enables us to distinguish different economical epochs. Instruments of labor not only supply a standard of the degree of development to which human has attained, but they are also indicators of the social conditions under which labor is carried on.

The significance of the instruments of labor were fully studied by Marx in *Das Kapital* (see, *inter alia*, Marx 1977a:283–7, 311–13, 492, 526, 751–2), while the role of labor in the development of hominids and humans was analyzed by Friederich Engels (1975). The views of Marx and Engels on anthropology (e.g. Engels 1972) were profoundly influenced by Lewis Morgan (1964).

However, for archaeologists researching ancient societies from a Marxist perspective, the study of finds—the instruments of labor—in themselves does not suffice. To understand the conditions under which these instruments were produced and to distinguish and classify the economical structure of the societies that produced these instruments, would be the goal of their scientific work. The study of the modes of production would clarify the understanding of these ancient societies and the archaeological findings originating within them. This approach does not imply any disrespect towards the study of archaeological objects and their typology within the framework of time and space. Only well-based, qualitative and quantitative archaeological data from the field can sustain the theoretical structure posed by a Marxist perspective of archaeology.

B. A Typology of Social Formations

Marx and Engels constructed a typology of social formations and modes of production. The first scheme of this typology appeared in the *Communist Manifesto* (Marx and Engels 1937), where the authors described the history of mankind as a series of class struggles: slaves against slave-owners, serfs against feudal lords and proletarians against capitalists.

A mature scheme of these modes of production is found in the *Foundations of Political Economy*, the *Grundrisse* (cf. Marx 1993:471–9).[1] This part of the *Grundrisse* is known as ‘Forms which Precede Capitalistic Production (Concerning the Process which Precedes the Formation of the Capital Relation

or of Original Accumulation)'.

In this scheme, Marx distinguished four modes or forms of production that characterize the history of mankind before capitalism. The development of these modes of production is not linear, nor is it a simple register of progress. In the first mode, ownership (of land) is communal; family and the extended family (clan, tribe, gens)[2] are the base of this form, sometimes called the 'primitive community'.

This primitive form of production actually developed into a second form called the Asiatic mode of production', a category extensively debated not only in the Marxist milieu, but worldwide among anthropologists and historians (Hobsbawm 1965; Mandel 1971:116–39; Anderson 1974; Godelier 1975; Hindess and Hirst 1975; Krader 1975). In the words of Marx (1993:472–3):

> The real *appropriation*[3] through the labor process happens under these *presuppositions*, which are not themselves the *product* of labor, but appear as its natural or *divine* presuppositions. This form with the same land relations as its foundation, can realize itself in very different ways, e.g. it is not in the least a contradiction, as in most of the *Asiatic* land-forms, the *comprehensive unity* standing above all these little communities appears as the higher *proprietor* or as the *sole proprietor*, the real communities hence only as *hereditary* possessors. Because the unity is the real proprietor and the real presupposition of communal property, it follows that this unity can appear as a *particular* entity above the many real particular communities, where the individual is then in fact propertyless, or, property—i.e. the relation of the individual to the natural conditions of labor and of production as belonging to him, as the objective, nature-given inorganic body of his subjectivity—appears mediated for him through a cession by the total unity —a unity realized in the form of the despot, the father of the many communities —to the individual, through the mediation of the particular commune.

Its features include a general absence of private in favor of communal ownership of land. In this mode, a contrast is drawn between a simple village community that integrates agriculture, husbandry and crafts, and a powerful, centralized state. The interaction of these two socio-economic spheres creates conditions that are peculiar to this mode of production (cf. also Hobsbawm 1965; Gottwald 1976).

In some respects, the 'Asiatic mode of production' resembles feudalism (and see below). Labor services and tributes are imposed on peasants on a local, familial or individual basis. However, political units are larger and more powerful than those associated with European feudalism. The owner is a king who is the representative of a community or state, while peasants are not personally bound as in feudal ties between nobleman and serf (cf. Mandel 1971:127).[4] The large, private estate is not the principal unit of production, but rather the royal and cultic estates and the village communities. Frequently, the ruling class becomes the *de facto* land-holder of large-scale estates (Mandel 1971:135). Cities in the proper sense arise side by side with these villages when their position is particularly favorable to external trade or when the rulers of

the cities exchange revenue (Marx 1970:71).

It must be stressed that at the time when Marx wrote the *Grundrisse*, knowledge of prehistory and ancient near eastern civilizations was imprecise. Modern anthropology was in its infancy, the written sources produced by the Mesopotamian and Egyptian civilizations were still undiscovered, and the pre-Columbian civilizations in America were hardly known. It was only in 1877 that Morgan's work *Ancient Society* (1964) provided the basis for Engels' (1972) analyses of the relationship between the family, property and the state.

The third form of production is the 'ancient mode', or slavery, which was the mode of production in Classical Greece and Rome. The structure of the community is based upon equality among the free, self-sustaining peasants, giving military service to the commune, but also upon the exploitation of a large part of the population who are slaves. One of the differences between the 'ancient mode of production' and the subsequent 'feudal mode of production' (or Germanic form as Marx called it), is based, according to Marx (1993:479), on the concept of the city:

> Ancient classical history is the history of cities, but cities based on land ownership and agriculture; Asian history is a kind of undifferentiated unity of town and country (the large city, properly speaking, must be regarded merely as a princely camp, superimposed on the real economic structure); the Middle Ages (Germanic period) starts with the countryside as the locus of history, whose further development then proceeds through the opposition of town and country....

The 'feudal mode of production' appears to have been an alternative evolution of primitive communalism, as a result of the mixture of the break-down of the Roman Empire and the conquering German tribal institutions (Hobsbawm 1965:28).

What is relevant for our subject is the assumption that, in *grosso modo*, the EB Age in the southern Levant can be included in the 'Asiatic mode of production', while the first part of this period, the EB I, and the previous Chalcolithic period (*ca.* 4500–3600 BC) comprised a transitional period from the 'primitive form' to the 'Asiatic mode of production'.

Since the 1960s, the discussion of the modes of production has intensified, and the theory has continued to develop, resulting in the examination of prehistoric and early historic societies around the world to determine which socio-economic formation they represent.

Marshall Sahlins (1972) attempted to define what he termed the 'domestic mode of production', and applied it to societies organized at the family or local level, which he identified with the Neolithic period. Continuing to some extent the work of Sahlins, Earle (2002) tried to define the political economy of the Bronze Age, viewing it as a sort of transitional period between chiefdoms and agricultural states as he defined them (Earle 1997; 2002:1–18). The work by Sahlins, followed by numerous scholars (e.g. Service 1975), is based on what Marx called the 'primitive form', while we believe that Earle's interpretation is

better integrated within the ‘Asiatic mode of production’.

Other authors have proposed to call the ‘Asiatic mode of production’ a ‘tributary mode of production’ (Gottwald 1976) or a ‘palatial mode of production’ (Liverani 2005: 50–54), indicating in these labels the most significant aspects of this socio-economic formation.[5] Since then, the utilization of the term and the discussion of the ‘Asiatic mode of production’ have increased around the world (cf. Hobsbawm 1964; Godelier 1975), especially as a critique of Stalinism, which attempted to negate the existence of such a mode of production in Marxist thought (Stalin 1940; and see Anderson 1974).

Joseph Stalin (1940:34) advocated a linear model in which all societies must develop from the primitive communal, through the slave and feudal modes of production, in order to arrive at Capitalism and then Socialism. Leon Trotsky (1962), however, developed an idea that was previously put forward by Marx, of an uneven and combined law of the development of mankind, which negates the mechanical application of the evolution of the socio-economic formations proposed by Stalin. Less developed social forms need not pass through all the historic steps, but could skip some of them. Conversely, different social formations can exist at the same time in the same or different territories (and see Novack 1974).

As mentioned above, for archaeologists following a Marxist perspective, the study of finds in themselves is not enough. We need to be familiar with the conditions under which these finds were produced and the economical structure that produced them.

C. Marxist Perspectives in Archaeology and Gordon Childe

The Soviet Union was the first country in which Marxist perspectives were applied after the October Revolution of 1917 (Trigger 1989:207). During the 1920s, the Soviet Union became a country where extensive resources were designated for archaeological field work and research (Trigger 1989:212–15; McGuire 2002:57–9). Freedom of expression was permitted for archaeologists who did not share the Marxist point of view as part of the New Economic Politics (NEP) led by Vladimir Lenin and Leon Trotsky.[6] Unfortunately, during the era dominated by the authority of Stalin, archaeology was limited and several archaeologists were persecuted. Archaeologists and anthropologists dealing with social theories often confused Marxism with Stalinism. This caricatural rendering, as McGuire explained in his work on Marxism and archaeology (2002:11), led to a series of attacks against Marxism (or what some authors call Neo-Marxism) as it is applied to the interpretation of the archaeological record (e.g. Binford 1987:403; Renfrew 1989:39).

Even worse, Marxist theories on anthropology are totally ignored by students and teachers of Syrian-Palestinian archaeology, including those within the universities of Israel and most of the USA (McGuire 2002:10).[7] In Israel, anthropological theories are almost completely ignored in the teaching of

archaeology. As one of my teachers at Tel Aviv University pointed out some time ago (Avi Gopher, pers. comm., 1993), it is not by chance that within the comprehensive work of Trigger on the history of archaeological thought (1989), only two Israeli authors are quoted.

V. Gordon Childe was the most outstanding proponent of the application of Marxist theories to the archeological record. Following are the main points in Childe's premises that are relevant to the present work:

1. The Neolithic Revolution placed in the hands of men, for the first time, control over nature and the food supply, i.e., this revolution changed the world of the hunter-gatherers. Selection and cultivation of vegetal specimens and husbandry of animals imply forms of exploitation of the natural environment that are different from those of hunter-gatherers. According to Childe (1930, 1935, 1936), the Neolithic communities first allotted and cultivated the land, and only then domesticated animals. Agriculture supposes a series of operations from the preparation of the land until the harvest and then a new division of labor among the communities.
2. Agriculture implies a series of changes in food preparation that is followed by separated labor forms, craft specilization and social division (Childe 1930). For instance, gender and age-related tasks changed according to these economic developments. Other changes are indicated in relation to animal husbandry.
3. The production and reproduction of the means of subsistence were amplified by the Neolithic Revolution, and a major division of labor and craft specialization came into existence. A demographic trend of population increase resulted, and altogether there was a surplus production that surpassed the needs of subsistence of the Neolithic community (Childe 1935).
4. Alongside the continuation of craft specialization in flint and grinding-stone tools, pottery production came into existence. As a result, systems of storage and food distribution developed. The husbandry of ovicaprines and bovines led to the improvement of other crafts such as weaving and leather treatment, as well as dairy production (Childe 1930).
5. The utilization and transformation of metal ores into tools, beginning with copper during the Chalcolithic period, further contributed to this process of specialization, labor division and goods production and exchange. The exploitation of ores and the processing of the metals

through melting and smelting, caused a further increase in labor division and craft specialization (*idem*). The EB Age in the southern Levant is the continuation of this process, beginning in the Chalcolithic period, when small villages began a process, through goods production and exchange, which led to primary urbanization.

6. Although the exchange of commodities was generalized, a small part of the economy was based on the exchange of prestige products such as exotic raw materials. Although exotic raw materials had an important impact in the archaeological record and it must be assumed that the dominant classes or elites used them to express and consolidate their power, we should not exaggerate their significance on the economy as a whole (Childe 1936).

Renfrew and Bahn (1994:412) have correctly pointed out that there is a re-awakening of interest in applying Marxist theories in archaeology. Hodder (1986:57–61) presents some interpretations by archaeologists who claim to utilize Marxist perspectives in their analyses of archaeological study cases. It is not within the scope of this work to open a debate with any of the authors quoted by Hodder, but some, if not all of them, could be included within anthropological structuralism (Levi-Strauss 1963), which uses certain aspects of the Marxist interpretations (Tilley 1990). However, structuralism has to be differentiated from dialectical materialism, as the concept of the 'structure' is a rigid, non-dialectic category. This school of thought has been called by Trigger (1989: 343) and Renfrew and Bahn (1994:415), the French neo-Marxism, and has in the anthropologist Maurice Godelier (1975, 1977), one of its main representatives.

3. Political Economy and Marxist Perspectives on Exchange

This section will explore the concepts related to exchange of commodities and the theory of value. As Marx's theory of commodity fetishism was one of the cornerstones of Marxist economic thought (Rubin 1972:7–30), it is the opinion of the present author that any work using a Marxist perspective in the analysis of exchange, and in this case in the exchange of goods in late Prehistoric society, must address this theory.

One of the criticisms of the Marxist approach to archaeology is that there is a gap between theoretical archaeology and field archaeology, i.e., that Marxist archaeologists tend to jump to high-level analyses but avoid dealing with the concrete archaeological data (Renfrew and Bahn, *idem*). This volume will consider the Marxist theory of commodities value and exchange as applied to an updated data base of archaeological material from the southern Levant of the EB Age.

The development of EB communities resulted in subsistence-based demands that could not be met by individual communities. This led to a need for exchange of commodities between different regions and settlements. Objects exchanged included not only basic commodities, but also prestige and luxury goods. In Marxist terms, exchange of commodities became a prerequisite for continuing production and reproduction of material conditions necessary for subsistence (Marx 1993:471–9).

The exchange of commodities in every society, even in those characterized by an 'Asiatic mode of production', resulted in the appropriation of alien labor (Marx 1993:509). This process was fully completed with the establishment of modern capitalistic society, as the exchange value of commodities only can be explained as the outcome of labor, or more precisely as the quantity of labor socially necessary to produce a certain commodity. Indeed, in certain respects within the Asiatic mode of production', commodities are exchanged and produced; however, the absence of general free labor meant that there was no tendency toward the internal dissolution of the Asiatic mode of production', and consequently, the potential for the development of capitalism out of the Asiatic mode of production' was never realized (and see Krader 1975).

The key difference between the Asiatic mode of production' and capitalism is the general absence of privately-owned land, and the direct appropriation of surpluses by the state from the village communities.

The challenge of this study is to understand goods exchange within the EB communities.

A. Theory of Value

The three main aspects of the theory of value in Marxist perspective are: (1) value is a social relationship among people, (2) it assumes a material form, and (3) it is related to the process of production of commodities (Rubin 1972:63).

The main characteristics of Marx's theory of value were borrowed and modified from the classical economists of the 18th century, David Ricardo and Adam Smith. Ricardo (2004:11) expressed his views thus:

> The value of a commodity, or the quantity of any other commodity for which it will exchange, depends on the relative quantity of labor which is necessary for its production, and not on the greater or less compensation which is paid for that labor.…

Furthermore, it was observed by Adam Smith (1954:12) that:

> The word value has two different meanings, and sometimes expresses the utility of some particular object, and sometimes the power of purchasing other goods which the possession of that object conveys. The one may be called value in use; the other value in exchange.… (things) which have the greatest value in use, have frequently little or no value in exchange; and, on the contrary, those which have the greatest value in exchange, have little or no value in use.… Water and air are

> abundantly useful; they are indeed indispensable to existence, yet, under ordinary circumstances, nothing can be obtained in exchange for them. Gold, on the contrary, though of little use compared with air or water, will exchange for a great quantity of other goods.

Ricardo (2004: 11) adds:

> In the early stages of society, the exchangeable value of these commodities, or the rule which determines how much of one shall be given in exchange for another, depends almost exclusively on the comparative quantity of labor expended on each.

Marxist theory claims that each commodity has a ‘use-value’, which, through its qualities, satisfies certain human needs (Marx 1977a: 126). However, this use-value actually comes into play only when an object is exchanged and consumed. For commodities to be exchanged, another type of value, called ‘exchange-value’, must be assigned to the object, so it has a value that allows for its exchange. The exchange-value of a commodity is calculated according to the average necessary labor force invested in it within a given society, a given level of technology and within the parameters of its physical location.

The object that becomes a commodity can then be exchanged for other commodities. For instance, X quantity of a certain crop can be exchanged for Y amount of flint tools. Notably, the exchange-value of commodities is completely dissociated from their use-value; the only commonality between two exchangeable commodities is in the amount of labor necessary to produce them (Rubin 1972:63–76).[8]

In his Synopsis of *Capital*, Engels (1937) explained that the concept of ‘exchange-value’ presupposes a *tertium comparationis* by which it is measured; i.e., labor, which is the common social substance of exchange-values, or to be more precise, the socially necessary labor-time embodied in them. In addition, the labor contained in a commodity is determined twofold: as a definite productive activity, e.g., weaving labor (‘useful labor’) and as the simple expenditure of human labor-power or abstract labor. The former produces ‘use-value’, the latter ‘exchange-value’. Therefore, the substance of exchange-value is abstract labor and its magnitude is the measure of time of abstract labor.

Engels (*idem*, 40–5), in his explanation of the section on value-form or exchange-value of commodities in *Das Kapital* (Marx 1977a: 138–63), outlines four forms of exchange-value.

Form 1

This is the simplest form of value, isolated or accidental. The expression of the equivalence of two commodities is the simple form of relative value, e.g.,

X commodity A = Y commodity B

In the above equation, Y commodity B is the equivalent. Here, X commodity A acquires its value-form, while Y commodity B acquires, at the same time, the property of direct exchangeability. To put this into terms of EB goods: X quantities of copper = Y quantities of basalt vessels. Exchange-value is impressed upon the use-value of a commodity by definite historical and geographical conditions, i.e., the use-value of the pottery and the use-value of basalt vessels in a particular period in the southern Levant.

The exchange-value of a commodity cannot be expressed by its own use-value, but only by the use-value of another commodity. Only in the equation of two concrete products of labor does the concrete labor invested in both appear as abstract human labor, i.e., a commodity cannot be valued according to the concrete labor contained in itself, as the mere realized product of abstract labor, but it can be related to the concrete labor contained in other kinds of commodities.

Form 2

This is the total form or expanded relative form of value. The equation X commodity A = Y commodity B necessarily implies that X commodity A can also be expressed in other commodities, thus Form 2 can be expressed as follows:

> X commodity A = Y commodity B = X commodity C = U commodity D = U commodity E = etc., etc.

Here, X commodity A, for instance X quantities of copper, no longer refers to one other commodity (the basalt vessels in our case), but to all commodities (pottery, crops, animals, etc) as mere forms of the labor represented in it. Through simple reversal, it leads to Form 3:

Form 3

Form 3 is the general or converse second form of relative value:

> Y commodity B = X commodity A
> Y commodity C = X commodity A
> U commodity D = X commodity A
> T commodity E = X commodity A

Here, the commodities are given the general relative form of value, in which all of them are abstracted from their use-values and equated to X commodity A (X shekels of copper) as the materialization of abstract labor. X commodity A is the generic form of the equivalent of all other commodities; it is their universal equivalent. The quantity of labor materialized in this equivalent represents abstract labor or labor in general.

Form 4

This form is labeled the money form. Form 4 is the result of fundamental changes that occur in the course of the transition from Form 1 to 2 and from Form 2 to 3. The difference between Forms 3 and 4 is that now the equivalent has assumed a universal form. However, any commodity of the series can take over the role of universal equivalent, but only one of them can do so at a time, since if all the commodities are universal equivalents, each of them would in turn exclude the others from that role.

Form 4 can be expressed as follows:

Y commodity B = X amount of A metal
Y commodity C = X amount of A metal
U commodity D = X amount of A metal
T commodity E = X amount of A metal

In Form 3, the commodities are not obtained by X commodity A, in our case metal, but by the other commodities. In Form 4, this special commodity, expressed in general as a metal, but also as other commodities whose natural form becomes identified with the general equivalent form, is money.

In Form 4, the exchange-value is called ‘price’, i.e., the exchange-value expressed in money. In the words of Marx (1993:189):

> Money is in the first instance that which expresses the relation of equality between all exchange values: in money, they all have the same name.

As Marx pointed out (1993:173), money appeared as a measure earlier than as a medium of exchange because in barter (Form 1) the commodity is its own measure of exchange. This, of course, was not the case during the EB Age in the southern Levant. Other goods, such as oxen and clothes, have been suggested as special commodities utilized as exchange mediums in antiquity.[9]

For the capitalistic mode of production, Marx (1977a: 163–77) pointed out that the difficulty with a commodity is that it represents a personal relationship under a material wrapping. The producers relate their different kinds of labor to one another as general labor by relating their products to one another as commodities.

The relationship between persons thus appears as the relationship of things and this phenomenon is equated in Marxist literature to ‘fetishism’, i.e., the belief in a supernatural power of objects (cf. Rubin 1972:5–60). Put in the words of Engels (1937:89):

> a commodity does not seem to become money only because the other commodities all express their values in it, but, conversely, they seem to express their values in it because it is money.

Although the main purpose of economic production is to create use-values and not exchange-values, barter or ‘spontaneous form of exchange’ as Marx

(1970:50) called it, is something most prehistoric societies engaged in (Forms 1 and 2). Barter gave rise to a need for conceptually assigning exchange-values to commodities based on use-values. In later forms of exchange, exchange-values are generally expressed in terms of metal weights (e.g., shekels,[10] talents, etc.) or other commodities, but *de facto*, no exchange medium is used (Form 3). Unfortunately, we cannot know for certain if this form existed during the EB Age in the southern Levant. In later times, these metal equivalents evolved into coins and money (Form 4).

B. Theory of Value and Exchange Patterns

In his work on the theory of value, Rubin (1972:65, 86–8) pointed out that one aspect of the Marxist viewpoint is the concept of social regulation of exchange, i.e., when two commodities that represent two types of merchandise are exchanged (for example crops and animals), these two economic branches are in equilibrium in terms of the distribution of labor carried out prior to the exchange. However, Marx never maintained that exchange is carried out in conditions of 'exact equilibrium'. He more than once pointed out that the qualitative 'inequality' of commodities is the necessary result of the division of labor and represents, at the same time, a necessary stimulus of exchange (e.g. Marx 1993:242).

While it is difficult, in the current state of research, to fully understand the division of labor within the communities of the EB Age, it is clear that regional or site specialization existed, and a delineation of the exchange patterns between the sites and regions can be obtained from the presently-available data. It can be assumed that settlements or communities that extracted specific raw materials or grew certain crops, and transformed these into artifacts or goods (at different levels of production), not only exploited these resources in their own workshops, but also entered into relations with other communities and settlements or intermediate merchants with whom they exchanged their products based on the principle of exchange-values, even though we have no written documents that substantiate it.

Based on this assumption, V Gordon Childe (1930) hypothesized that the proliferation of craft specialization witnessed during the Bronze Age was a result of heightened agricultural productivity that ensured a surplus for the community and allowed some segments of the population to engage in specialized, non-agricultural tasks and to exchange the surpluses with other communities.

At any rate, Marx (1970:50; 1993:479) suggested that real exchange in pre-capitalistic societies, as those of the southern Levant in the EB Age, was embedded in a certain simplicity of the economy, in spite of the beginning of the processes of urbanization and social complexity. The economic backwardness of the southern Levant, in relation to Egypt or Mesopotamia, found expression in an exceedingly low degree of craft specialization (see Joffe

1991, 1993), suggesting that real exchange occurred only between communities and not within them.

Exchange of commodities in antiquity does not imply a capitalistic form of production, as many scholars have suggested (e.g. Silver 1983, 1985). In the opinion of this writer, that view was successfully refuted some time ago by Salvioli (1979) and following him, Gaido (2003), who argued against the views of historians and economists who believed, under the influence of modern conditions, that full-fledged capitalism existed in ancient societies.

The reactions of substantivists (e.g. Renger 1994) and Sombartian supporters (e.g. Sherratt and Sherratt 1991) to such theories of capitalism *avant la lettre* produced, in this writer's opinion, yet a different type of inaccuracy, as these scholars reject the economic character of the circulation of commodities in pre-capitalistic societies. Here, however, it is suggested that this circulation does, indeed, have an economic character, which is to be found in the supply and consumption aspects of exchange. Commodities cannot be separated, but rather should be understood within the framework of a complete economic system.

The present researcher believes that exchange should be understood within the scope of a total economy but, in this instance, at a level concomitant with prehistoric societies. The study of local exchange within an EB Age framework must take into account the degree of development of the productive and social forces in that period within the southern Levant. Therefore, behavioral or formalist theories of exchange are rejected since they suggest that exchange and human social behavior do not change over time. In order to interpret exchange, it is necessary to take into account the chronological, technological and social characteristics of production in the specific period, i.e., the EB Age.

C. Commodity Values in the Ancient Near East

Commodity values in ancient societies have been studied ever since written sources emerged in archaeological excavations at the main sites in the ancient Near East. Topics studied include, among others, commodity values in Mesopotamia and Syria during the third millennium BC (Garelli 1969:275–82; Pettinato 1979), in Nuzi during the 15th century BC (Cross 1937) and Ugarit in the 14th–13th centuries BC (Heltzer 1978). Studies on commodity values have also been conducted in Egypt during the New Kingdom, which is parallel to the LB Age in the Levant (e.g. Cerny 1954). From the Iron Age in Judah we find some references to commodity values in the Bible (cf. Brown, Driver and Briggs 1979:564), although these have not been fully researched until the present (and see Elat 1979). In addition, study of the weight system of that period (e.g. Kletter 1998), can shed light on the economic scheme of commodities values.[11] However, the relevance of these studies to the research of local exchange in an illiterate society that has revealed no signs of measures, weights or mediums of exchange, is negligible, offering only a comparative approach to determining the value of goods in the EB Age of the southern Levant.

In Mesopotamia, we have several archives from the third to second millennia BC containing a rich but uneven documentation. In these archives, barley, sesame oil and wool are the main commodities for which we have data concerning their values (Garelli 1969:275–280). Other sources, such as the tablets from Cappadocia, dating to the second millennium BC, provide us with the values of metals (e.g., Veenhof 1972).

Despite all these corpuses of data, we lack numerical figures for the economic history of the ancient Near East that would allow a statistical approach until the 5th century BC, when astronomical journals from Babylon provide us with monthly reports revealing the development of commodity values from 464 to 61 BC (Slotsky 1997; Vargyas 2001; van der Spek and Mandemakers 2003). However, the great oscillations in the commodity values as provided by these journals, have led several authors to assume that the records are unreliable (e.g., Joannes 1994). On the other hand, the interpretation of these figures, whether they represent prices (e.g., Vargyas 2001) or exchange-values (van der Spek and Mandemakers 2003), is of outstanding significance.

For earlier periods, discussions focus on the real equivalent of dry and liquid measures (e.g., Zaccagnini 1976) and the fact that several peripheral regions, e.g., the southern Levant, were influenced by the major centers and their systems of measure could change along with those of the centers. The utilization of different types of weights is another matter for discussion: private weights vs. official weights, local weights vs. foreign weights in certain transactions, new weights vs. worn weights that may represent lesser measures, etc. (e.g., Veenhof 1972:57; Kletter 1998). Furthermore, distortion and falsification of weights and balances existed everywhere (e.g., Amos 8:5).

According to Garelli (1969:276–7), in cases where the data provided by the official documents differ from the evidence from other sources, it is possible that the official figures were amplified to give an impression of prosperity.

Seasonal fluctuations could be significant when calculating the values of foodstuffs, but unfortunately the data for periods earlier than the fifth century BC (see above), do not allow for statistics analyses or means of these values (and see van der Spek and Mandemakers 2003). Other explanations such as ‘dumping’ by powerful organizations such as the temple and palace, or double harvests in a year, must be considered for the ups and downs that are discerned in the exchange-values of commodities. To be sure, such considerations are difficult to study for the illiterate society of the EB Age in the southern Levant, nor do we have archaeological evidence of local exchange in the southern Levant for most of the commodities presented in the written documents from the main centers of the ancient Near East.

After discussing all the inherent difficulties in such an attempt, we present here a table of the main commodity values during the third, second and first millennia BC from several sites and regions in the ancient Near East (Table 2.1).[12]

Table 2.1 Main commodity values in different places and periods in the ancient Near East. For Mesopotamia, Hatti and Ugarit, the values are given for 1 shekel of silver. For Egypt the values are given for 1 deben of copper. Commodity values and units according to Cross 1937; Garelli 1969; Zaccagnini 1976; Pettinato 1979.

Commodity	*Ebla** *2500* BC	*Akkad 2380–2200* BC	*Ur III 2110–2000* BC	*Hatti 17–16th century* BC	*Nuzi 15th century* BC	*Ugarit 14–13th century* BC	*Egypt 12–11th century* BC	*Judah 10?–4th century* BC
Gold	1/5 shekel	1/8 shekel	1/15-1/10 shekel		1/9 shekel	1/4-1/3 shekel	1 deben = 200 debens	
Copper	180 shekels	240-280 shekels		240 shekels	340-450 shekels			
Lapis lazuli	1/3-1/5 shekel							
Gold daggers	25 shekels							
Bracelets	225 shekels							
Barley		150 sila	300 sila	270 sila	66 sila		1 khan= 2-8 debens	1 homer 15 shekels 2 measures 1shekel
Earrings	120 shekels							
Flour								1 measure 1 shekel
Legumes			120 sila					
Wine			45 sila			3.5 jars		
Oil			9-20 sila				1 hin = 1/2-2 debens	
Salt			600 sila				1 khan =4 debens	
Smoked fish			600 sila					
Clothes	291 clothes 17 mana 20 shekels							
Wool	17 bales**	3-6 mina	10-15 mina			5-15 mina		
Sheep	1-2.33 shekels	1/4-1 shekel	2 shekels		1-1.33 shekels	1 shekel	1-3 deben	
Oxen				4-12 shekels	10 shekels	10-17 shekels	30-130 debens	30 shekels
Donkeys		11-20 shekels			6-6.66 shekels	10-30 shekels	26-40 debens	
Horses								150 shekels
Slaves		5-20 shekels			30 shekels			10-20 shekels

* shekel of Dilmun (cf. Zaccagnini 1986)

** unknown measure, the translation of the word utilized is *abnum*, i.e., stone (and see Veenhof 1972:57 who proposes to translate it as "talent")

4. Ethnoarchaeology, Historical Sources and Early Forms of Exchange

This volume makes use of ethnography and/or historical sources that enhance

interpretation of the archaeological record; this is referred to as ethnoarchaeology and/or ethnohistory. Analogies drawn from ethnoarchaeological and historical sources enable, in some cases, identification of commodity-exchange patterns (Chapter 3). However, since all these sources represent a body of information too large to be dealt with within the scope of this work, only a few of the most pertinent studies will be discussed here.

Utilization of ethnography and history to explain the archaeological record is not without its pitfalls. Ethnoarcheology utilizes typical methods of anthropology for studying what some scholars call 'traditional' societies, which are still extant today.[13] In contrast, ethnohistory draws from both historical and ethnographic data to study cultures wherein a continuum exists between prehistoric and historic times, and makes use of historical methods that go beyond referencing books and manuscripts. An example of such an application can be seen in the study of American pre-Columbian and colonial cultures (e.g. Trigger 1982:3).[14]

The use and abuse of historical sources to interpret archaeological finds, and especially biblical sources, has been the focus of a vast bibliography and we do not have the space to expand on this matter (e.g. Levine and Mazar 2001; Finkelstein 2002; Finkelstein and Silberman 2002). Interpretation of historic sources has its own problems, as such sources always represent subjective points of view (what was chosen to be set down in the document), or simply because they do not present anything near a complete account of the phenomenon being studied, only partial information related to the find spot of the documents.[15]

For a variety of reasons, there is relatively little utilization of ethnography for the study of the southern Levant (e.g., Dalman 1928–2001; Marx 1967). Some notable exceptions are the works of LaBianca (1984), Betts (1989), Finkelstein (1990), London and Sinclair (1991), Biger and Grossman (1993), Ziadeh (1995, 1999), Greenberg (1996a:28–54), Bienkowski and van der Steen (2001), Rosen (2002) and Levy *et al.* (2008).

Kramer (1982:3–4, n. 1) has compared the problems encountered in dinosaur research with those that arise in archaeological studies of ancient societies. In both cases, we must rely on the interpretation of fossil records and analogies with the physiology and anatomy of present-day specimens. Kramer concluded that study of ethnographic societies, as with the study of modern animals, can aid in understanding the extinct paradigms.

In any case, the use of ethnographic approaches to archaeology is far from simple (e.g., Wendrich and van der Kooij 2002:13–26) and has engendered much discussion and debate between archaeologists who fully accept the use of ethnographic examples to analyze archaeological data (e.g., Torrence 1981; Watson 1980, 1999; Kramer 1982) and those who question their relevance (Wobst 1978; Trigger 1982). Some archaeologists reject outright the application of ethnographic data towards the explanation of archaeological material (Lamberg-Karlovsky 1989).

The position put forth here is that if we interpret the past based solely on analogy to the present, we will never learn of the forms of society that no longer exist today (Hodder 1982b: 14). However, ethnographic and historic parallels or analogies are relevant in three cases:

1. When ethnographic or historic parallels derive from the same region or country, although in a different (generally later) historical period. In this instance, comparisons are applicable as far as common geography and climatic conditions existed.
2. When ethnohistorical comparisons from adjacent regions for some reason comprise better sources on the subject. In this instance, comparisons are valid if they illustrate events in contemporaneous societies, taking into consideration any differences in the degree of economic or political developments.
3. Ethnographic and ethnohistorical comparisons between societies in different and distant geographical regions, as well as different absolute chronological frameworks, may be productive if the societies under consideration have similar degrees of economic and social development.

The use of ethnographic and historical sources in the present work does not imply in any way that they necessarily explain the archaeological data under discussion. Rather, they are understood as a means to interpret the archaeological finds as they seem likely to reflect ancient realities. There are no universal laws that apply to all societies irregardless of their nature (Childe 1946), thus, caution must be exercised when accepting results based on ethnoarchaeological approaches.

5. Spatial Archaeology and Exchange Models

This work exploits the potential for interpreting the archaeological record that exists in the spatial patterning of archaeological data (Hodder and Orton 1976).

Several techniques are useful for the study of distribution of commodities. The obvious, primary technique involves the plotting of distribution maps of finds, enabling the drawing of exchange routes and networks. Then, by taking into account topographical and regional aspects that likely had a bearing on exchange, it is possible to determine the principal direction of the flow of certain goods. Some of the models we will present below were adopted from the fields of geography (Price 1971) and sociology (Barnes 1972).

This volume will try to avoid a mechanical approach that regards the presence of certain goods (finds) as mere typological evidence. We will not

search for the principle of unity of assemblages, but rather their disparity, i.e., the contradictions that exist between the sources of the commodities and their find spots.

A. Networks

For this discussion, the concept of network must first be presented. It should be emphasized that the network model for the concept of social exchange was developed for the fields of anthropology, sociology and economic geography; it is not a model derived from political economy or the research of production and distribution systems (Irwin-Williams 1977).

A network is defined as a series of components linked by specified exchanges of goods belonging to one chronological horizon. It is a key concept for building exchange models (Plog 1977:128).

The network maps in this work represent relationships between sources of raw materials and centers of production of finished products, and locales where the commodities in question were found. It must be stressed that archaeological research is concerned with static units, i.e., sites, loci, contexts and activity areas within the networks, and in general does not deal with individuals. This work considers archaeological sites as the minimal economic units.

The study of networks also takes into consideration the proportion of specific exchanged goods within local repertoires, the number and kinds of goods exchanged between points, and the directionality of the flow of goods expressed in the ratio between imported and exported commodities at the different points of exchange (Irwin-Williams 1977:142–3). In the study and analysis of commodity distribution and exchange networks, quantitative aspects are of cardinal importance, since there is a direct relationship between distances and commodity frequencies (cf. Renfrew 1975, 1977). Unfortunately, while distances can be measured, the present state of available information does not enable quantitative estimates of most commodities. Exceptions exist, however, for data on stone tools and faunal remains.

B. Distribution Systems, Friction of Distance and the Costs of Exchange

Alden (1982:85–8) has classified distribution systems as direct and indirect. In direct distribution systems, members of each economic unit travel to other locations to acquire goods that they need. As pointed out above, in this work settlements are considered economic units.[16] Alden suggests that the existence of face-to-face contact between producer and consumer, rather than by way of nodes of exchange, could also be the result of itinerant craftsmen. In indirect distribution systems, goods are exchanged at a central location where economic contacts take place.

According to Alden (1982:86), indirect systems are inherently more efficient,

considering that the exchange-value of goods is not only composed of the labor invested in their production, but also incorporates the labor invested in their distribution. If several settlements exchange products, and the residents of each site travel to the others, the costs of distribution in such a system (and thus the exchange-value of the goods) will be higher than in a system where one of the sites functions as a distribution center.

In the indirect systems, the costs of distribution as calculated by Alden (*idem*, Fig. 4.1; Table 4.2) are lower than in the direct systems, irregardless of where distribution centers are located. However, if the distribution site is located in the center of the region of exchange, the costs of distribution would be even less. According to this model, the more settlements involved in specialized production that participate in the indirect model, the greater the savings, since the indirect distribution system will reduce the factor of distance.

Into these two models must be incorporated the ten modes of trade or exchange as defined by Renfrew (1975:42–53; Renfrew and Bahn 1994:321–7) (Table 2.2). Modes 1 to 3 are direct models, while Modes 4 to 10 are indirect models. Among these, Modes 4, 7–10 include the transport of goods over great distances.

It is interesting that these modes expose the relationship between distances and quantities or frequencies of exchanged goods. Here must be introduced the concept of 'friction of distance' (e.g. Johnston 1975). This concept is based on the notion that overcoming the problem of distance usually requires a certain amount of effort, money, and/or energy. Since the present work deals with a society that did not know money or other mediums of exchange (see above), this friction could only be measured in the amount of human labor invested. Because of this friction, spatial interactions will tend to be more frequent over shorter distances, and the quantity of interaction will decline with distance.

The relationship between distances and frequencies of exchanged finds can be measured and presented in graphs that show the fall-off of commodities in relation to the distance from the sources (Renfrew 1975:figs. 11–14). The modes of exchange should help to calculate the transport costs, i.e., the labor invested in carrying the commodities and the proportion of this investment in their exchange-value.

Table 2.2 Modes of exchange according to Renfrew 1975.

Mode	*Actors*	*Description*
Direct access	A ←———— / ———— B	B has direct access to the source of the material without reference to A. If a territorial border exists, it can be crossed.
Reciprocity (home base)	A ———→ X ←——— / ———— B	B visits A at A's home base, and they exchange the special product each of them controls
Reciprocity (boundary)	A ———→ / ←———— B	A and B meet at their common boundary for exchange purposes
Down-to-the-line trade	A ———→ X ———→ X ———→ X ———→ X B	Reduplicated home-base or boundary reciprocity (one way only), a commodity travels across successive territories through successive exchanges
Central place redistribution	A ——— / ———→ X ←———/ ——— B	A takes produce to the central place as tribute for the central person receiving something in exchange. B likewise takes produce to the central place and receives some of A's produce.
Central place market exchange	A ——— / ———→ X C X ←——— / ——— B	A takes produce to the central place and there exchanges it directly with B for B's produce. The central person is not immediately active in this transaction.
Freelance (middleman) trading	A ——→ X ←—M ——/—— /——M ——→ X ←— B	The middleman exchanges with A and with B, but is not under the control of A or B
Emissary trading	A ——→ X ←—— E / ———————— C B	B sends an emissary, who is under B's control, to exchange goods with A
Colonial enclave	A ——→ X ←—— E / ———————— C B	B sends emissaries to establish a colonial enclave near A, in order to exchange with A.
Port of Trade	A C ——— / ——→ E X E ←——— /——— C B	Both A and B send their emissaries to a central place, port of trade, which is outside the jurisdiction of either.

Key
A, B: Sources of material
X: Exchange
/ : Territorial boundary
C: Controlling person
E: Emissary
M: Middleman

On this question, Hodder (1974) has applied a regression model to study the fall-off in interaction between archaeological artefact distributions and what he calls a production, marketing or service center. The parameters of this model are found to vary in an interesting fashion. The use of a gravity model for predicting service areas around nodes of contact is also shown to be effective in archaeological contexts.

6. Sociology of Art and Marxist Perspectives on Iconography

This research will examine the use and symbolic meaning of donkey figurines, which we assume are related to exchange and transportation activities during the EB Age in the southern Levant (Chapter 10).

Marx and Engels made use of examples drawn from the history of art for their critique of political economy and their analyses of the function of cultural expressions and ideology (Marx 1993; Marx and Engels 1970). The basis for Marxist analyses of artistic expressions can be construed from the famous phrase of the Introduction to *Contribution to the Critique of Political Economy* (Marx 1970:20–1):

> The totality of these relations of production constitutes the economic structure of society, the real foundation, on which arises a legal and political superstructure and to which correspond definite forms of social consciousness. The mode of production of material life conditions the general process of social, political and intellectual life. It is not the consciousness of men that determines their existence, but their social existence that determines their consciousness.

In other terms:

> An ideology is both the product of, and a requisite for, a group attaining a political consciousness and as such always serve to integrate some class or portion of a class in power struggles. In order to maintain dominance, a ruling class needs to be integrated by an ideology and will typically mystify domination by representing their interests as the common interests of the whole society. (Marx and Engels 1970:64)

Ideology does not exist solely in the mind, but has observable material and behavioral manifestations that spring from the day-to-day reality. Social groupings, behavior, and material objects embody ideology and lend it reality (McGuire 2002:142).

The analysis of artistic expressions related to exchange in the present work has been strongly influenced by the works of Arnold Hauser, a Marxist sociologist who adressed the problems of artistic representations through the ages and their relationship with the production modes and ruling classes of their time (Hauser 1951, 1982). In Hauser's works, the question of prehistoric art and the relationship between society and art are analyzed from a Marxist perspective. In general, he was interested in explaining why determinated styles in art and iconography, naturalistic or geometric, represent social forces and the struggle between them (e.g., Hauser 1951:66, 199). Hauser's analyses did not take for granted the supremacy of the infrastructure over the superstructure. He writes that the 'infrastructure' upon which the superstructure rests, consists not only of material and interpersonal constituents, but also of intellectual, conscious and individual ones (Hauser 1982:xx).

Other perpectives that partially adopted certain aspects of the Marxist assumptions, without referring to the economic structure of the society in

question, must be mentioned (and see Hodder 1986), for instance, 'cognitive processual' and 'narrative rhetoric' approaches developed by Renfrew (1993) and Hodder (1993).

The 'cognitive' approach is an attempt to examine the ways in which symbols were used, rather than search for the meaning of past symbolic systems. For example, Renfrew (1998) examined the iconography of transportation in later European prehistory in order to show how 'cognitive constellations' function to illustrate and reinforce the social ethos. He succeeds in detecting a number of symbolic associations, for instance the horse and rider, which has survived for over two thousand years and is still seen today in equestrian statuary. However, it is not enough to assume that a particular object is the vehicle for transmitting a dominant social ethos, e.g., an object of art that is utilized for communicating values. The task is to define which social interests a particular ethos represents in a defined context, in a defined period and in a defined socio-economic formation.

In addition, 'narrative rhetoric', which is used to persuade people, could partially assist in interpreting such figurines. In the words of Hodder (1993:270–1):

> Rhetoric concerns the devices or forms used to persuade an audience of a narrative. In language such rhetorical devices and figures are metaphor, metonymy and synecdoche.

Hodder (*idem*) proposed that similar uses can be applied to material culture objects and archaeology. For instance, metonymy is an expression that refers to one thing by substituting an associated object or idea. Archaeological examples occur whenever an object is employed to stand for the owner of the object, for instance, a figurine that represents its owner.

It is assumed that the figurines related to exchange in the southern Levant are not simply mechanical or direct representations of reality, but encompass a dialectic relationship between the material and the ideal (and see Hodder 1986:30). In summary, the present research deals not only with the social significance of donkey figurines, but also with the ritual and ideological worlds of the societies in which these representations were created.

Notes

1. For the place of Marxist thought in economic history see Kula 2001:16–19. For the evolution of the points of view of Marx and Engels on historical periodization, see Hobsbawm 1965.

2. The word utilized by Marx is *Stamm*, which broadly refers to any extended kinship grouping.

3. All italics in the original.

4. On the use and abuse of 'feudalism' among Marxist historians see Hobsbawm

1965:62–4. For a different point of view *vis-à-vis* the relations between 'feudal' and 'Asiatic' modes of production, see Liverani 1975.

5. Schloen (2001:255–360) rejects the 'Asiatic mode of production' for the Bronze Age in the Near East, and proposes the Weberian model of 'patrimonial society'. Unfortunately, the discussion of this model is beyond the scope of the present volume.

6. The main archaeological schools that existed before the revolution continued to exist in the Soviet Union, and a few important archaeologists such as M.I. Rostovtsev abandoned the country (Trigger 1989:214–15).

7. McGuire (2002:62–89) has synthesized the work of archaeologists who utilized Marxist perspectives in several places in the world, mainly in North, Central and South America.

8. 'Whatever its social form may be, wealth always consists of use-values, which in the first instance are not affected by this form. From the taste of wheat is not possible to tell who produced it, a Russian serf, a French peasant or an English capitalist. Although use-values serve social needs and therefore exist within the social framework, they do not express the social relations of production … We cannot tell by looking at it that the diamond is a commodity. Where it serves as an aesthetic or mechanical use-value, on the neck of the courtesan or in the hand of the glass-cutter, it is a diamond and not a commodity. To be a use-value is evidently a prerequisite of the commodity. ‖ Use-value is the immediate physical entity in which a definite economic relationship -exchange-value- is expressed' (Marx 1970:27–8).

9. For axes, see Michailidou 2003; for oxen, see Homer (*Odyssey* XII, 44); for clothes, see Weiner and Schneider 1989; Levy *et al.* 2006:718–19.

10. In Hebrew and other Semitic languages the root of the word שקל (Akkadian *šiqlum*) means 'to weigh' (Brown, Driver and Briggs 1979:1053–54).

11. Although a comparison with prices in Roman Palestine are far beyond the scope of this volume, we recommend a comparison with the values collected and analyzed by Sperber (1991).

12. The exchange-values of three specific commodities, barley, sesame oil and wool for Mesopotamia in the third and second millennia BC (including the Assyrian colonies of Cappadocia) is given by Garelli (1969:278–9).

13. A number of syntheses on this subject are available in Vossen 1984; Féblot-Augustins and Perlès 1992; David and Kramer 2001:360–77.

14. It should be noted that the fields of anthropology and history tend to overlap with economics and determining where one discipline ends and another begins is a problem that has been discussed in the past (e.g. Adams 1974; Godelier 1977:15–62).

15. See also Wattenmaker (1990:273–5; 1994), who claims to have discerned contradictions between the appearance of ceramic finds in the archaeological record at Ebla and their absence in the written sources of the site.

16. We do not belittle the importance of production and exchange within the settlements or households, but this subject is beyond the scope of this volume.

II
COMMODITIES

> Marx did not only show that human relations were veiled by relations between things, but rather that, in the commodity economy, social production relations inevitably took the forms of things and could not be expressed except through things … Illusion and error in men's minds transform reified economic categories into 'objective forms' (of though) of production relations of a given, historically determined mode of production—commodity production.
>
> (Rubin 1972:6)

3

Pottery Vessels as Commodities

1. Pottery Production, Exchange and Ethnographic Examples

A. Pottery Production and Resources

While much of the discussion in this work concerns EB pottery it should be stressed that very little is known of pottery workshops in the southern Levant of that period. There are few obvious potter's workshops or work spaces. Few artefacts used in smoothing and finishing the pots such as bone spatulas for example have been reported, although sealings on pots were recovered in several sites, mainly from the EB II.

Again it can be pointed out that in the case of the EB of the southern Levant we have little evidence. Remains of a kiln from Tel el-Farah (N) was dated by the excavator (de Vaux 1955:558–63) to EB II, pottery 'Période 3'; i.e., EB II). This unique published example of an EB kiln from the southern Levant is classified as an example of a 'vertical' type (Wood 1990:26–30). Another kiln from Bet Yerah, dated to EB III, has been reported (Maisler, Stekelis and Avi-Yonah 1952:227, Fig. 3:6). Paz (2006:63–7), has published this pottery workshop that included several instruments for pottery manufacture.

Additional evidence of potting activity is found in several potters' wheels from Qiryat Ata (EB II?; Rowan 2003: 191, Fig. 6.3), Megiddo (EB I, III; Loud 1948: Pl.268:1,2), Jericho (EB III?; Kenyon and Holland 1983: Fig.231:2), Tel Yarmuth (EB III; de Miroschedji 2000:697–8, Fig. 11; 2003:168*), Tel Miqne[1] and Horvat Ptora (EB I; pers.observ.). However, no precise locales have been defined as workshops complete with all components of pottery ateliers (kilns, potter's wheels, hand tools, etc.), as have been found for later periods (cf. Wood 1990:20, Figs.12–15).

Arnold's (1985:35–60) study of ancient pottery production discusses the

availability of necessary resources (i.e. clay, temper, fuel, water, etc). Crucial to development of this industry are critical distances (known as 'threshold distances') between population centers and sources of raw materials. They must be within proximity to each other to make the related activity, in this instance, pottery production, worthwhile in regard to the quantity of labor and other resources invested. Beyond that threshold returns of such activity are not worthwhile and accordingly, such activity does not take place.

Browman (1976) has also addressed similar issues in a discussion on effectiveness (in terms of costs and return) for exploitation of territories in relation to economic activities of ethnic communities in South America. He took several elements related into consideration: (1) distance to the resources; (2) transport and other energy costs for obtaining resources; and (3) social costs (if the members of the community are very distant from resources) that demand temporary physical separation of members from the community. These parameters must be taken into account in any discussion of sources of raw materials and their relation to centers of production.

While fuel and water must almost always readily available at any site where pottery manufacture occurred, clay and tempers (non-plastics) are significant components that must have been available within the limits of threshold distances. Other factors also come into play that determine sources, especially for pottery manufacture. Clay quality is one, and it may be affected by tempers present or artificially added during the process of pottery production. Many clays contain some natural non-plastic components but experience shows that potters often add materials such as sand, crushed stones, shells, straw, grass, or even crushed pottery (grog), in order to achieve specific end results (e.g. hardness, porosity, aesthetic qualities). Other resources such as paints and slips are used in smaller quantities in relation to clay and temper. Tools are often community property and their influence on costs in ceramic production is negligible (Arnold 1985:36–7).

Instance of transportation of raw materials to centers of production are numerous. Arnold (1985:Table 2.1, Fig. 2.5) brings ethnographic examples of geodesic distances to clay resources from less than 1 km to 50 km. These examples came from all over the world, mainly Latin America, South and central Asia, and Oceania. However, there are only a few examples from the Near East and the Eastern Mediterranean. One of them is from the village of Beit Shebab in Lebanon where potters bring clay from a source located 2 km away. Another is Kafr Lebbad in the West Bank, Palestine, where clay sources are encountered 8 km from the workshop.

Two additional cases from the region under study are instructive because they indicate the extent of traditional parameters for transportation of raw materials for ceramic production in the southern Levant. One, of particular interest to the present study is from a much later era. Adan-Bayewitz (1993: 25, n.5) while researching Roman pottery from Galilee, noted a potter working at Akko transported clay from Upper Galilee, some 6–12 km to the east. A

second case is a potter's workshop at Zizia, Jordan (*ca.* 30 km south of Amman), which belonged to a group of migrant potters from Egypt (see below). Those potters brought four types of clay from Suweilah, some 40 km to the northwest, for preparation of vessels (London and Sinclair 1991:421–2).[2]

From the cases presented above, it may be concluded that in ancient times raw materials for pottery were not traded or transported over distances greater than 50 km (Porat 1989b: 170). However, each case must be analyzed according to historical and geographical circumstances with real distances between sources of materials and centers of production dependent upon different factors. Thus, it seems likely that efforts to improve ceramic production could instigate a search for better raw materials that in turn could see exploitation of new and different sources of clays and tempers (see Goren 1991a: 15*–16*).

B. Exchange of Pottery

Ethnographic studies of pre-industrial pottery cultures demonstrate that the primary means by which pottery is diffused is direct exchange. Secondary means involve the relocation of consumers, i.e., people migrating from one region to another and transporting their pottery (Wood 1990:59–60).

In addition, studies based on textual and archaeological sources from Mesopotamia and Syria dated to the third millennium BC (Pettinato 1981:169–72; Mazzoni 1988; Wattenmaker 1998; Wright 1998) have concluded that while pottery was found in abundance in the excavated storerooms of the palaces, no information about the exchange of pottery vessels is provided in the texts. One plausible interpretation (Wattenmaker 1998:50) is that the elites did not focus their attention on the pots, which were not valued as commodities, and for this reason the vessels do not appear in the inventories or the registration of the palace's exchanged goods. However, as Archi (1982:202, 212) and Mazzoni (1992) have proposed for the jars in Palace G at Ebla (mid-third millennium BC), it appears that they originated in peripheral localities where potters had their workshops and were collected by the central administration.

Rice (1987:192–7), following Renfrew (1975, 1977) has summarized ethnological evidence on ceramic trade and exchange, indicating five different options. The following options, specifically intended to explain methods of distribution may also explain dispersion of non-ceramic finds:

1. The consumer travels to the potter, as in the examples of Chiapas, Mexico (Howry 1976), and the Siuai of the Solomon Islands (Oliver 1955).

2. The potters travel to the consumers, carrying the vessels on the potter's back, a donkey, a canoe or by any other means of transportation. Examples include Pagago Indian potters (Fontana *et al.* 1962: 23), and Costa Rica (Stone 1950). Other examples are the potters who work in Zizia, Jordan and sell the

pots in their town and at el-Qastal, some 5 km distant.

3. The potters and the consumer travel to a third location (e.g. market, fair, street-corner, etc.). For instance, in Guatemala potters or their relatives come to local markets (Reina and Hill 1978:207–8) selling their commodities to consumers who attend the market. A similar situation is described for Yoruba areas in Africa (Hodder 1962: 116). That may also have been the case of Roman pottery from Kefar Hananyah and Kefar Shihin studied by Adan-Bayewitz (1993:23–6). Apart from archaeological data, Adan-Bayewitz has presented in his study some Talmudic sources indicating the purchasing of pottery in markets at these two locations. Certain tractates (*Tosefta Bava Metzia* 6.3 and *Bavli Bava Metzia* 74a) seem to discuss prices of potter's balls of clay (Hebrew ביצין של היוצר, 'potter eggs').[3] According to Adan-Bayewitz (1993:26), the passages do not relate to clay balls but to pottery vessels since the debate presented in *Bava Metzia* 5.7 is on the price of pottery in its last stages of preparation in relation to wine and oil.

4. The potter sells the vessels to a third party, a middlemen or a wholesaler as the '*regatones*' and '*comerciantes*' from Guatemala (Reina and Hill 1978:207, 215). Balfet (1981: 262) mentions peddlers transporting pottery vessels into the Atlas mountains in Morocco up to 40 and 50 km from the point of production (quoted by Esse 1989b:89, n.30). Other examples show even longer distances, as the case of high-quality pottery in Ghana, traveling 100 km in primary distribution, and farther in a secondary distribution (Crossland and Posnansky 1978:87).

5. The potter transfers vessels to a central agent which assigns him with goods in exchange, as in the case of a monopolist merchant in Mexico (Renfrew 1977:14) or the Inca storage jars at Huanuco Pampa (Morris 1974). All these options are idealized categories, and may occur in combinations, including what Polanyi and others (1957),[4] Sahlins (1972), and Service (1975) call reciprocity and redistribution (Rice 1987:191–2, 195–6).

2. Distribution of EB Ware Types

A. Gray Burnished Ware

Definition

Gray Burnished Ware (GBW henceforth) was identified by Wright (1937) who called it 'Esdraelon Ware', on the basis of its massive presence in the Jezreel Valley area; he divided GBW into four Types, labeled 1 to 4. This ware is characteristic of a group of shallow and deep bowls, some of them carinated and some of them with pedestals. Some have a series of flattened, sinuous projections at the line of carination or conical knobs, others have applied rope decoration, while others have no decoration. To those three types is added another curved type with small conical knobs projecting in a ring below the

exterior rim of the bowl. Most of them are characterized by a gray to black lustrous or burnish on their surface (Wright 1958:41*), although some of them are of light buff, yellow or ivory colors, depending on different conditions of firing (Braun 1996b: 176). Related types or imitations of the GBW such as 'Crackled' ware (Esse 1989b) or 'Mottled' ware (Braun 1985:62) are discussed below.

Sources

GBW is so distinctive an element in EB I material culture that it has been the object of much discussion from the time it was first discovered. It was considered by Wright as an 'intrusive or imported element in a native horizon' (Wright 1958: 40*). Contrary to Wright's view, many scholars have considered the GBW as locally made. They have noted evidence for its regional pattern of distribution (e.g. Kenyon 1960; de Vaux 1971; de Miroschedji 1971; Handbury-Tenison 1986; Esse 1989b; Braun 1991; Stager 1992).

Hennessy (1967:35–40) and Mazar (1990:103) have recognized the local origin of the GBW, but suggested the shapes and decoration are of eastern Anatolian origins. Lapp (1968:34) claimed that GBW was in imitation of Chalcolithic basalt vessels done by EB I 'newcomers', who had a 'weak' tradition in making stone vessels. Braun (1990:94, Fig. 4) has stressed the similarities between Chalcolithic fenestrated pedestal pottery vessels and GBW bowls. Further similarities exist between some GBW bowls and a so-far, unique example of a pedestaled basalt bowl from Megiddo (Guy and Engberg 1938:Fig. 21). Philip and Rehren (1996) have suggested that GBW was meant to imitate silver vessels, e.g. the silver goblet of Tel el-Farah (N) (de Vaux 1951:587, Fig. 13). However, Amiran (1983) suggested the silver goblet was actually made in the image of pottery goblets that have no relation with the GBW.

Most recently, Goren and Zuckerman (2000) carried out research on the GBW both from petrographical and typological points of view, arriving at the conclusion that each type of Wright's classification belongs to a different petrographic family and that their sources are to be found in the northern regions of the southern Levant. Following is a summary of the results of their research in which they have designated what they term 'Families', labeled I to IV (instead of Wright's Types'), of vessels of like typology and fabric. The present work has divided the GBW into sub-families taking into account petrographic research and morphology of vessels as suggested in a recent work by Yannai (1999).

Family I (similar to Wright's Type 1)

This family is basically composed of shallow carinated bowls with flattened, sinuous knobs or protrusions. Goren and Zuckerman (*idem*) divided it mainly into two subtypes: bowls with flat bases and bowls on fenestrated pedestals (and see below) (Figure 3.1:1–8).

The clay of these bowls is usually buff with calcite grains, and grog inclusions. The matrix is composed by marl rich in foraminifers, of Senonian-Eocene ages. The origin of this group is probably Senonian marl of the Central and Northern Galilee. This family, according to clay profile and tempers, originated in the Jezreel Valley and/or other places such as Western Galilee and the Huleh Valley (Goren and Zuckerman 2000: Appendix A). Sub-families Ia and Ib used crushed calcite or calcareous sand for tempering and they are classified on morphological grounds (and see below). Subfamilies Ic and Id have as common temper grog plus calcareous sand (the majority) or crushed calcite.

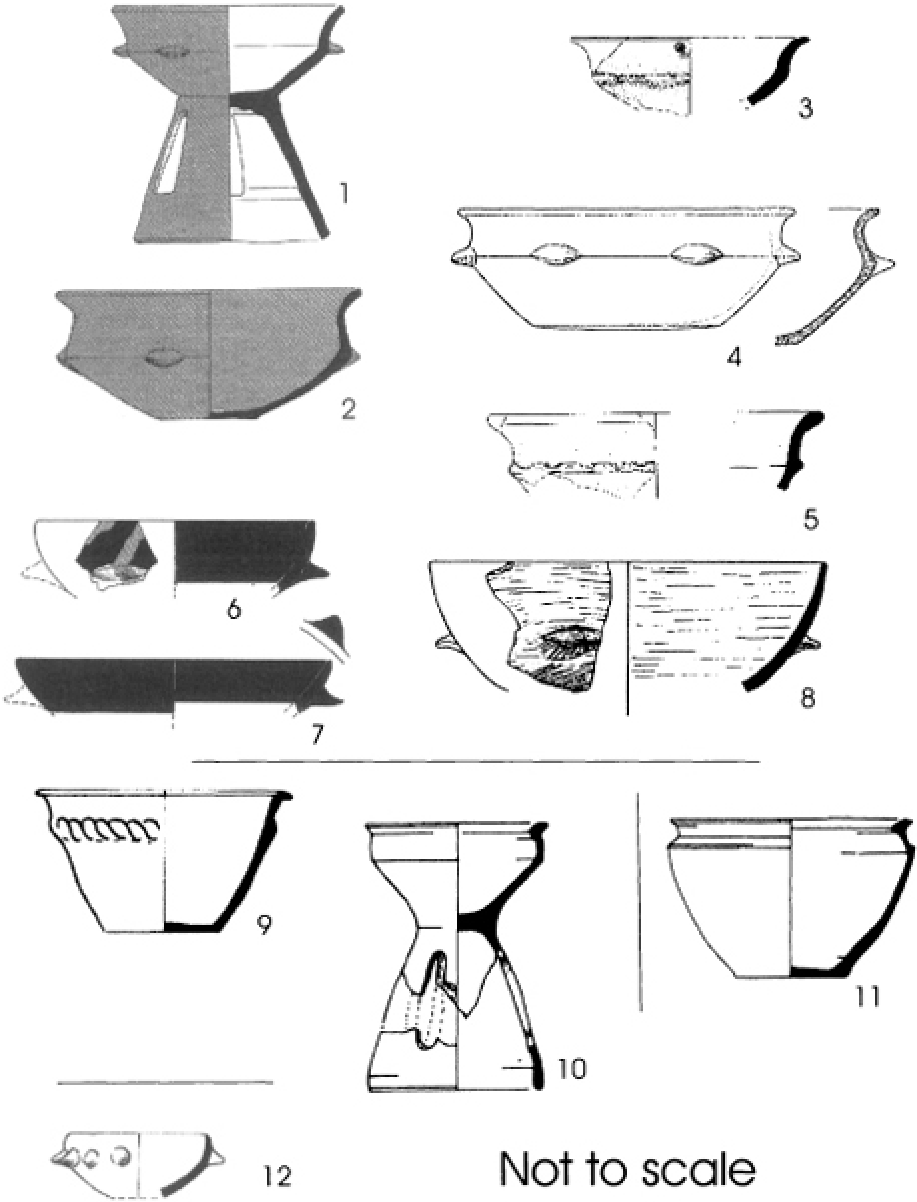


Figure 3.1 Gray Burnished Ware. 1 and 2. Family Ia, Yiftahel. 3. Family Ib, Yiftahel. 4. Type Ic, Affula. 5. Family Id, Affula. 6 and 7. Family Ie, T. Teo. 8. Family If, Kh.Uzza. 9. Family II, T. el-Farah (N). 10 and 11. Family III, Assawir. 12.Family IV, Affula. After Goren and Zuckerman 2000.

Some of these vessels contain chalk sand and are labeled as sub-family Ie, which probably originated in the Huleh Valley. Others have basaltic and calcareous sand tempers and are labeled here sub-family If. It has its sources in Western Galilee.

Family II (= Wright's Type 2)

The vessels of this family were found in tombs at Tel el-Far'ah North and another, nearby site, Aqrabanyeh. They are divided into two subtypes: bowls with flat bases (Figure 3.1:9) and bowls on fenestrated pedestals. They are usually self-slipped, but not burnished, and the clay is generally darker than that of Family I. Laminar, rectangular, or flat shale fragments and spherical grains of quartz sand are visible within the clay matrix, as well as limestone grains. This petrographic profile is found only in this family. It derives from the Lower Cretaceous, and its provenance seems to be the eastern Samarian region (Goren 1991c).

Family III (= Wright's Type 3)

This family is composed of narrow and deep bowls exhibiting carination near the rim (Figure 3.1:10–11). Some of them (e.g. Yannai 1999, 2006) have fenestrated pedestals (Figure 3.1:10) but all lack external plastic decoration. The clay is usually buff, rich in basaltic, calcareous and/or quartz sand inclusions; the slip is thin and tends to peel. The clay, as in Family I, is rich in foraminiferous marl, of Senonian-Eocene origins. The source of the clay may be the marl of Galilee, but it is tempered with different materials, pointing to several possible sources: the Jezreel Valley area (as in Family I), the western Galilee (Kabri), the Huleh Valley (Tel Teo), and the central Jordan Valley.

Family IV (= Wright's Type 4)

This family is composed of deep hemispherical bowls with a series of pointed knobs under their generally incurved rims (e.g. Figure 3.1:12). Their slips are usually dark in color, restricted (in general) to their outer surfaces and rims, while their finish tends to be less lustrous with some exemplars red painted or even made of light cream colored clay. Some of the exemplars are not even burnished. The fabric of this family is that of Family III.

Miscellaneous Types of GBW

This is a group of vessels coming from excavations at a number of sites, including Affula, Bet Haemeq and Afridar, Ashkelon (Area G). These vessels do not fit with any of the above-described types or petrographic groups. Some of the vessels (Afridar, Area G) are made of clay with Lower Cretaceous shales and originated in eastern Samaria. Others (Bet Haemeq, Affula) are made of clay rich in foraminiferous marl with calcareous sand inclusions, originated somewhere in Galilee or northern Canaan. Finally, there is another group from Afridar (Area G) made of undifferentiated clayey, silty matrix with calcareous/ quartz sand for which origins within the southern Levant have yet to be established.

Distribution

The distribution of GBW is presented in Table 3.1 and Figures 3.2–3.3 according to families. A somewhat lengthy description of the data and the archaeological contexts appears in Milevski 2005:43–51.

Table 3.1 Distribution of Gray Burnished Ware bowls according to family.

Families / *Sites*	*Ia*	*Ib*	*Ic*	*Id*	*Ie*	*If*	*II*	*III*	*IV*	*Miscelanea*	*References*
R.Haniqra	+					+					Tadmor and Prausnitz 1959:Fig. 6 23,:24,26
Kabri						+					Kempinski and Niemeier 1991:Fig.13:10-12
B. Haemeq	+					+		+		+	Givon 1993:9:6
Kh. Uzza						+					Ben-Tor 1966:Fig. 4:1
Q. Ata								+	+		Fantalkin 2000:38; Golani 2003:Figs. 4.2:7-10
T.Megadim								+	+		Wolff 1998; pers. comm.
T.Na ama					+						Greenberg et al. 1998:26
T.Teo					+	+			+		Eisenberg 1989:Fig. 7:1-4; Eisenberg, Gopher and Greenberg 2001:Fig.7.2:2-4
Gadot					+						Greenberg 1996a; 2001a:Fig.9
Y.Hamaaleh					+						Greenberg 1996a; 2001a:Fig.9
T.Hatzatz					+						Greenberg 1996a; 2001a:Fig.9
B. Yerah	+?		+?		+						Greenberg and Paz 2004:Fig.7:1-4; Greenberg et al. 2006:3.35:1-3
Yiftahel	+	+									Braun 1997:Figs. 9.2; 9.3; 9.4:1-5
T.Qashish								+	+		Ben-Tor, Portugali, and Avissar 1981:Fig.:7:20; Zuckerman 1996a:Figs. I, BIII, VII:1-17
T. Qiri				+				+			Baruch 1987:Fig.70:6-10-12
A.Zureiq			?								Meyerhof 1986: Pl.23
Hazorea								+	+		Meyerhof 1989:Pl.24: 107, 140, 144, 167, 168
E.Shadad								+	+		Braun 1985:Figs. 18:8-11;, 19:1-10
Affula			+	+				+	+	+	Sukenik 1936:Pl.I:7-8; 1948:Pl.2:21; 1948:Pl. II:1-11; Gal and Covello-Paran 1996:Fig.4:7-8, 13,14, 18
Megiddo				+				+	+		Engberg and Shipton 1934:19, Fig. 6:17A, 18A,B; Guy and Engberg 1938:Pl. 3:26-27, Shipton 1939:45; Braun 1985:Fig. 36; Joffe 2000:163; Fig. 8.1.3, 12
T.Jezreel	?	?									Gophna and Shlomi 1997:Fig.4:1-3
K.Glickson								+			Ziegelmann 1978:Fig.2:1-3
E. Assawir				+				+	+		Dothan 1970:Pl. 6:1-15; Yannai 1996:Fig. 2:17-24; 1999:Fig. 1:3-5; 2006:Fig.17. 4:9-16)
Metzer				+							Dothan 1957:Fig.2:2; 1959:Fig. 8:1, 3
T.Farah (N)							+	+			Goren 1991c
Aqrabanyeh							+				Goren 1991c
A. edh-Dhahr		?		?							Parr 1956:Fig. 13:24
T. esh-Shuneh			+		+	?		?	?		Rowan 1994:126–7, Fig. 12:1-2
T.Bet Shean			+	+							FitzGerald 1935:Pls. III: 2,4;V:28
T.Shalem									+		Eisenberg 1996:9, Fig.13:8
U.Hammad			+	+							Helms 1986:Fig. 11:2; 11-12; Betts 1992:Fig.216:5,8
K. Jericho											Khalaily 2002
Jericho		?	+						+		Pritchard 1958:Pl. 37; Kenyon 1965:21, Fig.7:8
'Ai									+?		Marquet-Krause 1949:Pls. LV:1055, LXXIV:1055
T. en-Nasbeh									+?		Wampler 1947:Pl.52:1124
Azor										+	Golani and van den Brink 1999
Palmahim			+	?							Gophna 1974:Pl.10:9; Braun 1992
Afridar										+	Braun and Gophna 2004

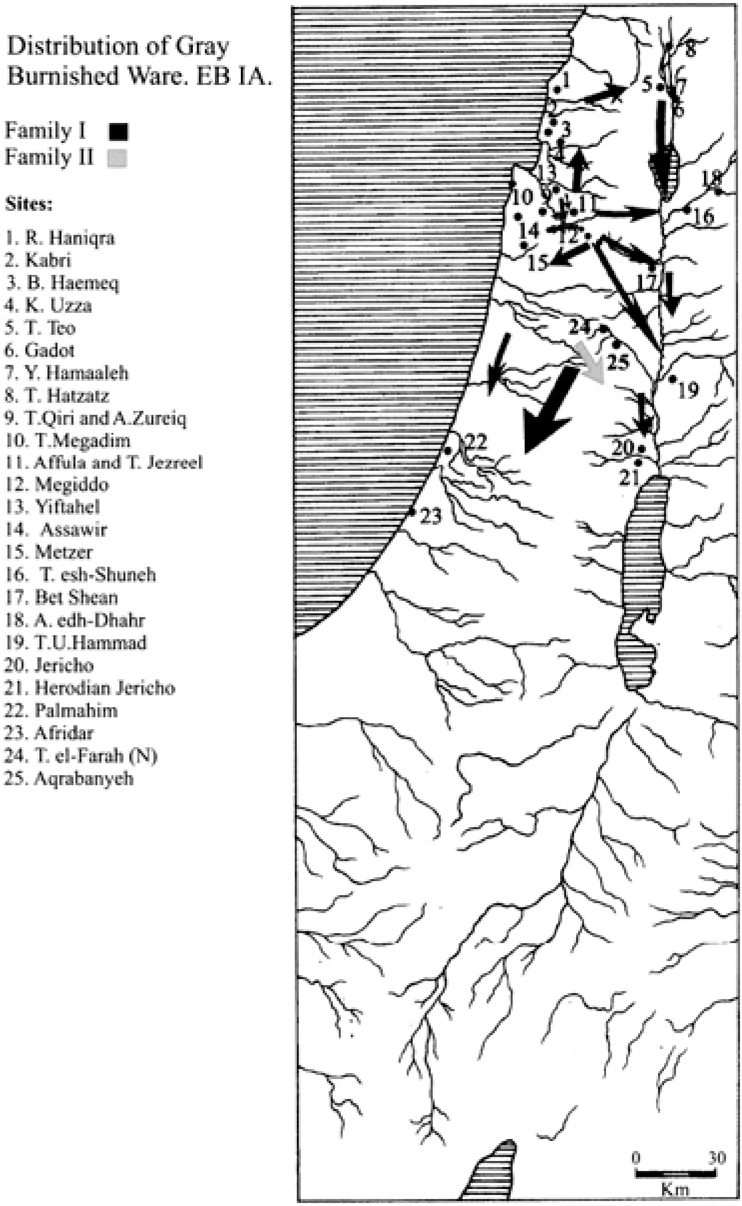


Figure 3.2 Distribution map of Gray Burnished Ware, EB IA.

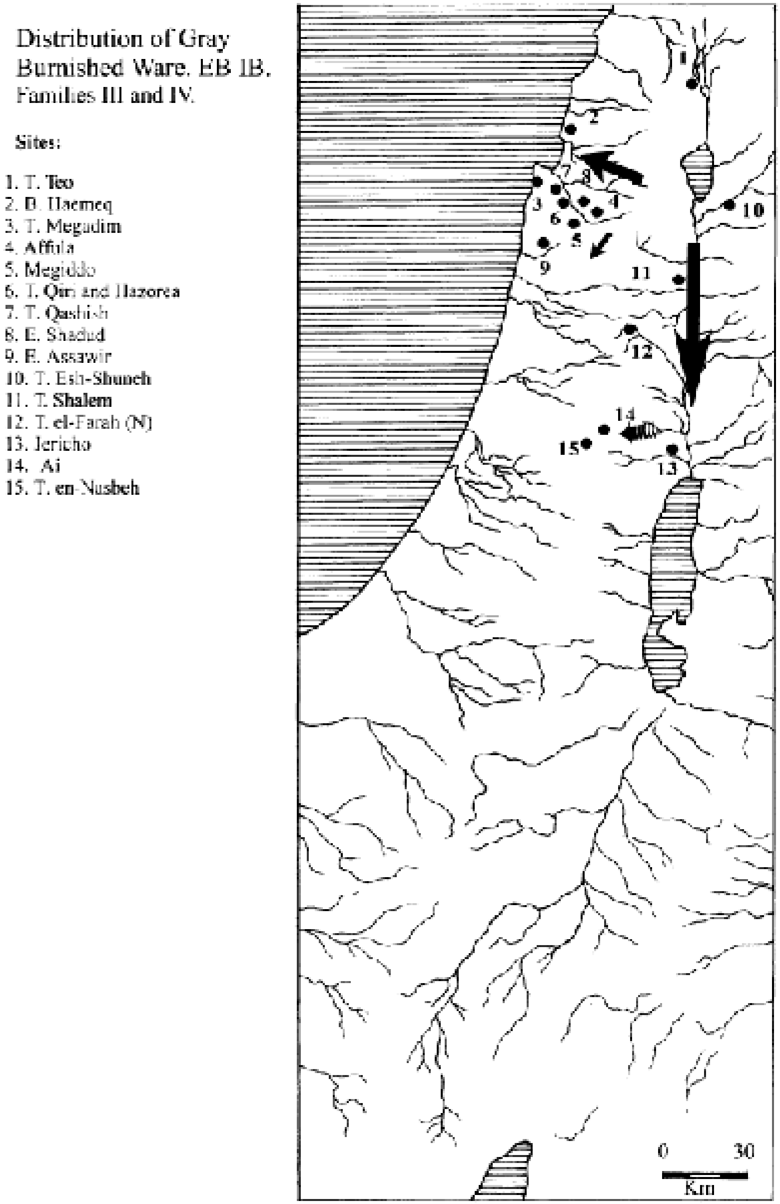


Figure 3.3 Distribution map of Gray Burnished Ware, EB IB.

The main areas where Family I is encountered are the Western Galilee, Lower Galilee, the Jezreel Valley, the Huleh Valley, and the Jordan Valley. Other areas were this family is encountered are the Central and Southern Coastal Plain. Family II is encounterd only in the area of Tel el-Farah (N) and Aqrabanyieh.

Families III and IV are mainly encountered in the lower Galilee and the Jezreel Valley, and the Jordan Valley. They appear also in the Central Coastal Plain and the Central Hill Country.

Chronology

Wright (1958), based on data from the excavations at Tel el-Farah (N) and Jericho considered Types 1 and 2 (here Families I and II) (Figure 1:1–2 and 3–4) to be earlier than Types 3 and 4 (here Families III and IV) (Figure 1:5–6 and 7). He related Types 1 and 2 to the EB IA or early EB I and Types 3 and 4 to EB IB or late EB I, contemporary with Red Burnished and Line Painted wares of the south (Wright 1958:43*). This chronology is confirmed by later excavations, mainly those conducted at En Assawir by Yannai (2006). Family I shallow bowls were found in Stratum III (EB IA) (e.g. *idem*, Fig. 17.4) and Family III deep bowls were found in Stratum II (EB IB) (e.g. *idem*, Fig. 2.5:1–7; see also Goren and Zuckerman 2000). At Tel Umm Hammad, while some examples of Family III appear in the early EB I Stage 2, they certainly are intrusive (see above). Conversely, no vessels of Family I are represented in the late EB I Stage 1 (cf. Betts 1992).

At Palmahim, Family I appears in Stratum 3, dated to the very beginning of the EB IA and is associated with sausage-shaped buildings of the village (Braun 1992). It is not, however, found in Strata 1 and 2, dated to the end of EB IB. On the other hand, at En Shadud, Families III and IV are present, but this is site does not represent the latest phase of the EB I; Braun (1985: 99–100) dated it to a post-Yiftahel II phase of Early EB I. It is likely that Families III and IV were not present at the very end of EB I and that a stage prior to the EB II, without GBW existed within the EB I in northern Canaan (Braun, in press).

Summary and Discussion

GBW is one of the hallmarks of the EB in the north. While Families I and II should be dated to EB IA, Families III and IV are characteristic of EB IB. The materials employed in the fabrication of GBW[5] show that special attention was given to those properties of the vessels, especially in Family I.

As noted by Zuckerman (1996a:75) and Yannai (1999) regional differences between the families and their variants are also consistent with regional attributes characteristic of EB I pottery assemblages. This indicates that GBW is not an intrusive component of the EB I horizon, although it does exhibit northern influences as in the Dark Face Burnished Ware (DFBW) and the Khirbet Kerak Ware (and see below).

While GBW is a northern phenomenon, some types of vessels were distributed in the central and southern part of the country, while some few related examples have been found in Lebanon, Jordan and Egypt. Some may even have been imitations of their northern originals made by local potters who intended to imitate GBW types.

Distribution patterns of early and late families of the GBW show some remarkable differences. Family I seems to have had three different areas of production within the northern part of the country. One is the core area of the Jezreel Valley with its distinct subfamilies Ia, Ib, Ic, and Id. They may represent

production of four different village workshops which distributed vessels within a core area within a maximum radius of 50 km and beyond it to regions further afield on the Coastal Plain and in the Jordan Valley. Alternately, one of these production centers could have utilized different types of temper that accounted for different petrographic profiles of fabrics it produced, as in the example of variants Ic and Id. That would suggest that tempers made their way to the workshop by exchange, i.e., that middlemen or potters from a different locale within the core area brought material to craftsmen at a workshop. An example could be that a workshop at Assawir received clay and/or temper from potters working at Affula some 30 km distant.

A second region that appears to have been a center of production is the Huleh Valley which seems to have produced Sub-family Ie. A third center of production seems to have been the Western Galilee where at least one variant of Family I (If) has been identified. We know that this variant was distributed in the Huleh Valley and even northwards, in Lebanon. A fourth center of production is suggested by examples from Afridar Area G. Analyses of their petrographic profile indicate an eastern Samaria source for the clay, but the few data we have on these types preclude more precise conclusions.

As shown in Figure 3.2, relationships between the different variants of Family I are notable, with variants from one center of production found within areas of different sources. Distribution from these centers seems to have been to the east as far as the Jordan Valley as far south as Jericho, and in limited quantities farther east through the *wadis* of Transjordan to Arqub edh-Dhahr. The coastal plain seems to be the second way that GBW traveled west and then down the coast as far south as Palmahim Quarry.

Family II is a singular phenomenon, probably confined to the Samaria region.[6] For all the variants of this Family we suggest here that the vessels were exchanged by groups of potters who traveled between villages (ethnographical case 2), mainly within the core area of distribution, and/or middlemen (ethnographical case 4) who distributed the GBW to other parts of the country.

Families III and IV originated and were distributed mainly in the Jezreel Valley core area (Figure 3.3). Some vessels of Families III and IV found in the Huleh Valley (Tel Teo), Western Galilee (Bet Haemeq), and the central Jordan Valley (Tel Shalem, Tel esh-Shuneh), could have been locally made as indicated by the petrographic analyses of Goren and Zuckerman (2000:175).

While the distribution of Families III and IV is partly analogous to that of Family I for which there is evidence to indicate several workshops. Furthermore, some vessels found in the Central Hill Country, i.e. ‘Ai (et-Tell) and Tel en-Nasbeh, seem to be local imitations of GBW vessels according to their petrographic profiles and morphological characteristics. There is a vessel from ‘Ai, for instance, that is a combination of Families III and IV forms. Furthermore, the fabrics of some of these vessels from ‘Ai and Tel en-Nasbeh are different from those of vessels of these two families found in the core area (see Braun 1996b: 176ss).

We suggest that the ethnographic models of exchange (see above) of Families III and IV could be similar to those of Family I, while the amounts and degree of exchange vessels seems to be more restricted.

B. 'Metallic' Ware

The unifying features of this ware are in its fabric, the composition and the firing of the paste at high temperatures. The fabrics are notably inelastic and brittle when struck give a characteristic metallic-like sound when struck, hence the name. There is a limited use of decoration on vessels of this ware, aside from the presence of combing patterns, thin slips, and generally continuous matte burnishing.

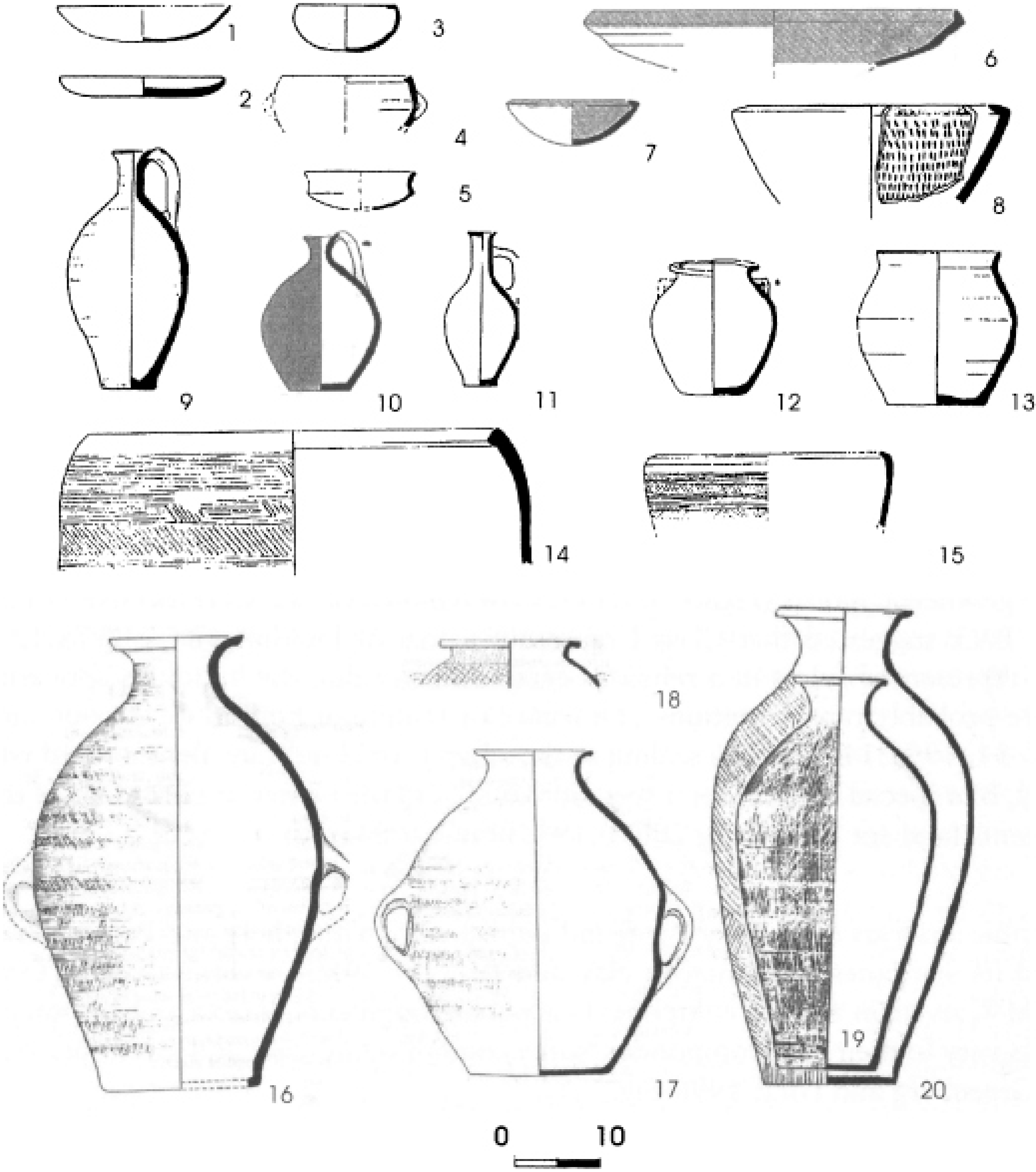


Figure 3.4 Metallic Ware. 1. Saucer bowl (Type B1a), Tel Teo. 2. Idem, T. Dan. 3. Saucer bowl (Type B1b1), Hazor. 4. Saucer bowl (Type B1b2), T. Teo. 5. Saucer bowl (Type B1c), T. Teo. 6. Platter bowl (Type B2a), T. Teo. 7. Platter bowl (Type B2b1), T Teo. 8. Platter bowl (Type B2b2), T. Dan. 9. Jug (Type J1a), Kinneret tomb. 10. Jug (Type J1b), T Dan. 11. Jug (Type J2), Kinneret tomb. 12. Small jar (Type SmJ1), T. Dan. 13. Small jar, (Type SmJ2), T. Dan. 14. Vat (Type V2), T. Dan. 15. Vat (Type V1), T. Teo. 16. Storage jar (Type Sj1a), T. Dan. 17. Storage jar (Type SJ1b), T. Dan. 18. Storage jar (Type SJ2), T. Dan. 19. Storage jar (Type Sj3a), T. Qashish. 20. Storage jar (Type SJ3b), Hazor. After Greenberg and Porat 1996.

Vessels produced in 'Metallic Ware' (henceforth MW) include all household and industrial types, aside from cooking pots. They duplicate almost all the EB II repertoire of non-MW pottery types. Main types are saucer-bowls (Figure 3.4:1–5), platters (Figure 3.4:6–7), jugs, juglets (Figure3.4:9–11), small jars (Figure 3.4:12–13), combed vats (Figure 3.4:14–15), combed jars and pithoi

(Figure 3.4:16–20). A distribution of vessel types, according to the classification provided by Greenberg and Porat (1996:6) is given below in Table 3.2. Donkey figurines and bed models made of MW have also been found (Greenberg 1996b:Fig. 3.38). These figurines are discussed separately (see Chapter 10).

MW has been studied and defined from a typological and technical point of view by Greenberg and Porat (Porat 1989a, 1996; Greenberg and Porat 1996; Greenberg 2000). This volume accepts their definition of MW and uses it as a basis for discussion. MW has alternately been termed 'Abydos Ware'[7] or 'Combed' Ware by different scholars (Prausnitz 1954; Mazzoni 1986; Esse 1991:109–16; Ben-Tor 1991b:107–9). It is generally defined as belonging either to EB II or EB III in date, but as stated below, it is a actually a hallmark of EB II of northern Canaan. In two recent works Greenberg (2000, 2001b) labeled this group as North Canaanite Metallic Ware (NCMW) in order to differentiate it from southern Syrian types that appear to be similar.

Some pithoi of this ware, known mostly only from fragments, bear cylinder and stamp seal impressions. There is a strong connection between these impressions and MW as Greenberg (2001b) and Joffe (2001) have pointed out.[8] These impressions were dealt in the pioneering research by Beck (1967) bear two types of motifs classified by Ben-Tor (1977, 1978) as Classes I and III: geometric motifs (Figure 3.5:1–3,5,7–8) and cultic scenes respectively (Figure 3.5: 4, 6, 9). Beck suggested that Class I represent a sort of building (Beck 1976:123–4) and Class III represented rulers in a religious ceremony and that the buildings appearing in the seals were probably representations of a palace or temple or both as in Mesopotamia (Beck 1967:49–51, 1995:14–17). The sealing of the vessels could indicate a) a standard volume for the vessel, b) a special content for a specific vessel or c) the owner or controller of the vessels and contents (and see Greenberg 2001b: 193, Braun 2004a:28).[9]

Sources

Petrographic analyses of MW by Porat and published by Greenberg and Porat (1996:13–18) described its attributes of its matrix clay and tempers. While several kinds of tempers are used in MW, its main temper components are shale fragments, quartz and carbonates. Shale fragments vary in their silty component: some contain silty quartz and others are rich in iron oxides (Greenberg and Porat 1996:Fig. 7:1).

A considerable variety of clays was used to produce MW but in general the same silty components as in the tempers are present. The components of the clay matrix are quartz, iron oxides, carbonates and mica laths. The source of the quartz is desegregated siltstone. The iron oxides are rhomboid and some of them have a hollow center (*idem*, Fig. 7:6) and the carbonates are not evenly distributed. The mica laths also probably originated in the siltstone.

According to the petrographic profiles of MW described above, Greenberg

and Porat (1996:16) concluded that the raw materials utilized for MW vessels come from a sicliclastic formation, composed by non-calcareous clays, siltstones and mature sandstone, all rich in iron oxides and related to weathered basalts. Formations that fit with this petrography are the basal Lower Cretaceous formations, which overlie Lower Cretaceous flows of weathered basalts. While these formations crop out in the eastern slopes of the Galilee hills, the largest outcrops are found in the Hermon massif and in Lebanon (Figure 3.6). The closest Canaanean site to this location is Tel Dan.

Notably, petrographic studies on MW pottery from Lebanon show their clay components differ from those of MW (Matson 1960). This has been interpreted by Greenberg and Porat (1996:18) as proof that the production center of the MW must be in the vicinity of the Hermon massif and is probably at Tel Dan (Biran, Ilan and Greenberg 1996).

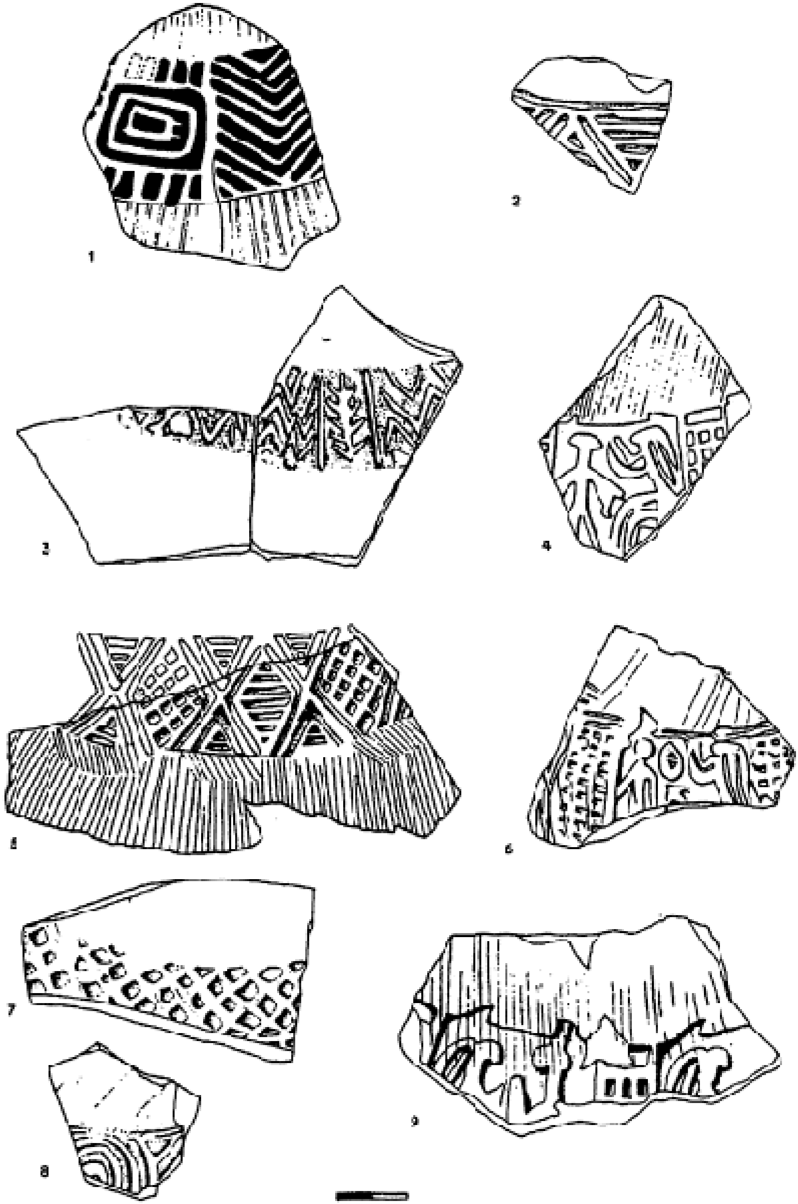


Figure 3.5 Seal impressions on Metallic Ware. Classes I (1–3, 5, 7, 8) and III (4, 6, 9). 1–2. Bet Haemeq. 3–4. Tel Qashish. 5–6. Bet Yerah. 7–9. Tel Dan. After Greenberg 2001a:Fig.11.1.

Distribution

MW vessels have been found at more than 30 major sites within the Levant, most of which are presented in Table 3.2 and Figure 3.6. The distribution of seal impressions on MW vessels is shown in Table 3.3.[10] A detailed discussion of MW according to regions is found in Greenberg and Porat 1996 (and see also Milevski 2005:58–63). The most abundant quantities of this ware were found in the Huleh and upper Jordan Valleys, the southern Lebanese Biq`a, the Golan

plateau, the highlands and coast of southern Lebanon, the Galilee, and the Jezreel Valley. Few types of this ware appear also in the southern regions but in lesser quantities.[11]

Table 3.2 Distribution of Metallic Ware according to vessel types.

Types	*Bowls B1*				*Platters B2*				*Jugs J1–2*			*Small Jars SmJ 1–2*		*Vats V 1–2*		*Storage jars SJ1–3*					*References*
Sites	*a*	*b1*	*b2*	*c*	*a*	*a1*	*b1*	*b2*	*1a*	*1b*	*2*	*1*	*2*	*1*	*2*	*1a*	*1b*	*2*	*3a*	*3b*	
T. Dan	+	+	+	?	+	+	+	+	+	+		+	+	+	+	+	+	+	+	+	Greenberg 1996b:99–133
B. Ma'acah*																					Dever 1986:220
T. Teo	+	+	+	+	+	+								+							Greenberg 1987:134–42; Eisenberg, Gopher and Greenberg 2001
T. Na'ama	+				+	+		+	?												Greenberg *et al.* 1998:24–6, Fig. 22:1-9, 11-17
Gadot	+	+			+			+	+		+					?	?				Greenberg 1996a:133–5, Fig. 17; 2001b:Fig. 14:1-3, 6, 9, 13, 15, 17, 19-21
Hazor		+			+			+	?	+		+	+	+		?	+				Yadin *et al.* 1989:Pl. CLIV:2, 4, 5; Greenberg 1997a:187–93
T. Ruweisa*																					Amiran 1953:123
Meona																?					Braun 1996a:17, Fig. 10:10
R. Haniqra					+	+						?				?			?		Tadmor and Prausnitz 1959:Fig. 5:17-19, 22, 26
Kabri	+						+				+					+					Scheftelowitz 1990:X, Fig. 21:14; 2002a:103–4, Fig. 5.8
B. Haemeq					+	+													+		Givon 1993:16, 19–20, Figs. 12:1-11, 15:1,2
Gamla																					Porat 1989a:Fig. 10.9
Leviah*																					Kochavi 1993, 1994; Greenberg and Porat 1996:Fig. 5
T. Kinrot								+	?							?					Fritz 1990:22, Pl. 51:14, 19,20
B. Yerah					+	+										+		+	+		Esse 1991:46–7, Pls.1:F-H, 2:A-I; Greenberg and Paz 2004:Fig. 11; Mazar, Amiran and Haas 1973:179, Fig. 5:1,2
K. Tomb								+	+		+										
Qishyon*																					Cohen-Arnon and Amiran 1981
T. G.Hefer	+				+				+							+					Covello-Paran 2003:110–11
Q. Ata																		+			Fantalkin 2000:39; Golani 2003:121–47
T. Qashish					+	?										+					Zuckerman 1996a:123, 129,130; Figs. X:14, 17-18?, XI:3,6,7, XV:5-7
H. Haruvim																+					Pers. observ.
Megiddo						+			+							+					Engberg and Shipton 1934:10–11; Loud 1948:Pls. 101:7-9, 23; 105:3-6; 107:16, 34, 35
T. Taanakh																					Esse 1982:213–14; 1991:92
Kh. Ez-Zeraqon									+								+			+	Ibrahim and Mittmann 1987, 1994; Genz 2002
Bet Shean*																					Mazar, Ziv-Esudri and Cohen-Weinberger 2000:270
A. al-Kharaz		+							+	+											Fischer 1994:132; Fischer and Toivonen-Skage 1995; Goren and Fischer 1999
T. Yaqush*																					Esse 1993:1503
T. Shalem*																					Eisenberg 1996:12, Fig. 17:6
T. el-Farah (N)				+	+				+							+			?		de Vaux and Stève 1947: Fig. 4:8, 6:2; 1948:555, Fig. 4;
T. Dalit					+	+															Gophna 1996: 122–3, Figs. 47:4,50:1-7)
'Ai					?												+				Market-Krause 1949: Pl. LXXIX:145 II; Callaway 1980: Pl.68:9?
T. Yarmuth	+			+					+												de Miroschedji 1988: 71, Pls. 21:6; 23:1,7-8, 24:6, 25:22
T. Erani*																					B. Brandl, pers. comm.
Lachish	+							+	+		+	+									Gophna and Blockman 2004:876–9
Ashkelon*																					L. Stager, pers. comm.
Arad					+																Amiran *et al.* 1978:114–15, Pls. 23:7, 97:10
B. edh-Dhra																					Lapp 1989, 2003

Note: (*) Sites mentioning MW without specific types or miscellanous forms.

Table 3.3 Distribution of seal impressions on Metallic Ware according to classes.

Types *Impr.* *Class* *Sites*	*SII*	*References*
T. Dan		Greenberg 1996b: 142–9
Meona		Braun 2004a: 18–23
B. Haemeq		Beck 1976
Leviah		Epstein 1972

T. Kinrot	Fritz 1990
B. Yerah	Ben-Tor 1978:7, 11–12; Greenberg and Paz 2004:Fig.12
H. [illegible]	Ben-Tor 1978:4
T. Qashish	Ben-Tor, Bonfil and Zuckerman 2003:167–75
Q. Ata	Greenberg 2003a
T. Taanakh	Ben-Tor 1978:6–7; Lapp 1969
Kh. Ez-Zeraqon	Genz 2002
Bab edh-Dhra	[illegible] 1989; [illegible] 2003

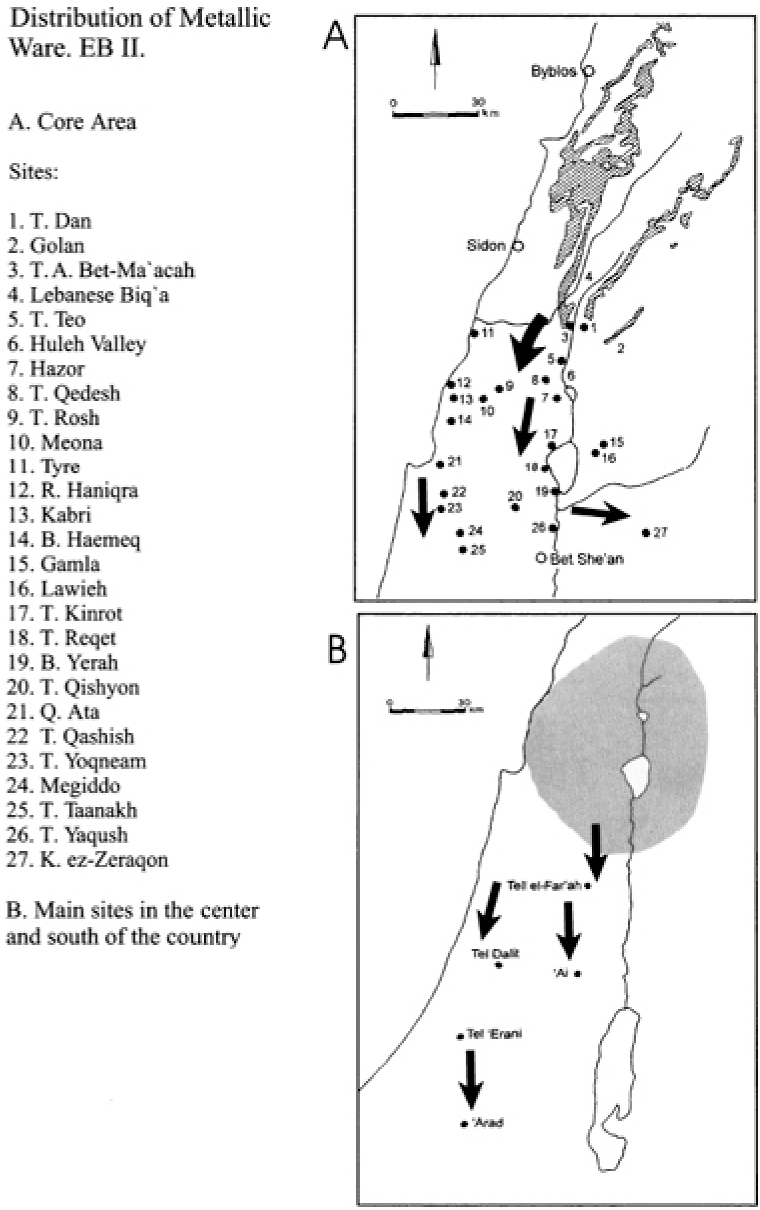


Figure 3.6 Distribution maps of Metallic Ware, EB II. After Greenberg and Porat 1996.

Chronology

In northern Canaan MW appears in strata between EB IB and EB III levels, e.g. Bet Haemeq (Givon 1993:Figs. 11–13, 15), Kabri (Scheftelowitz 1990:X), Rosh Haniqra (Tadmor and Prausnitz 1959), Tel Qashish (Ben-Tor, Bonfil, and Zuckerman 2003), Tel Qishyon (Cohen-Arnon and Amiran 1981), Bet Yerah (Esse 1982, 1991) and Tel Teo (Greenberg 1987:134–42). In central and southern Canaan, secure dating for MW in EB II strata is provided by the finds from Tel el-Farah (N) (de Vaux and Stève 1948:Fig. 4) and Arad (Amiran *et al.* 1978: 114–15, Pl. 23:7).

However, there is some indication that MW vessels first made their appearance as early as late EB I. This pottery has been reported from strata at three sites dated to EB IB, probably to the very end of this period. They are Tel Yaqush (Esse 1993:1503), Tel Shalem (Eisenberg 1996:12, Fig.17:6) and Tel Abu al-Kharaz (Fischer 1994:132; Fischer and Toivonen-Skage 1995; Goren and Fischer 1999), all located in the Jordan Valley. This has been interpreted as evidence for a stage between the last phase of EB I and EB II in the north of the country (Eisenberg, *idem*).

While jars and pithoi still appear in early EB III contexts (Greenberg and Porat 1996:12; Greenberg 2000, and bibliography there) they seem not to continue late in EB III, from which we can conclude that MW is essentially a phenomenon related to the EB II period.

Discussion

The main areas of distribution of MW were in Western Galilee, the Jezreel Valley, the Huleh Valley, and along the south-western shore of the Sea of Galilee. The appearance of a small number of sherds in the very end of the EB IB at Tel Yaqush, Tel Shalem and Abu al-Kharaz, and one sherd at Bet Shean in the late EB II, seems to indicate it was an area outside of the core distribution area. The absence of MW in the southern Jordan Valley and the Dead Sea area (e.g. Jericho, Bab edh-Dhra) must be interpreted in the same way. This indicates the distribution line of northern pottery during the EB II was different from that in EB I (e.g that of GBW), and in the following EB III (e.g. Khirbet Kerak Ware).[12] It looks as if the main line of distribution of MW to the south went through the coastal plain and the Shephelah, instead of the Jordan Valley.

From the distribution of different types within the MW assemblages (Table 2) it can be observed that only small vessels, mainly bowls, platters and jugs, made their way to the central and southern regions. Large vessels, especially storage jars, did not pass the southern line of ‘Ai, and the distribution of vats was restricted to the Huleh Valley with Hazor as the southernmost locale in which they have been found. The extremely regional distribution of the MW points to some social and economic restraints on their distribution that are analyzed below.

Sealings found on MW vessels are, with the exception of Khirbet ez-Zeraqon

in the hill country of Jordan, concentrated in the western Galilee, the Huleh Valley, the Jezreel Valley, and the northern Jordan Valley; they follow a similar pattern of distribution for MW as a whole. The social role of the seal impressions during the EB has been discussed (Joffe 2001 and bibliography therein) giving several answers to the question. However, in the case of seal impressions on MW vessels a connection with the center of production and the restricted distribution of the ware is clear. There must have been some relationship between control of production and distribution of vessels. If the motifs of the impressions represent institutions of control (such as the palace or the temple) then it is suggested that these impressions are an important part of exchange and distribution of MW vessels.

The general picture that emerges from a study of the production and distribution of MW illustrates a highly centralized socio-political uniformity (Greenberg and Porat 1996, Greenberg 2000) at least in the northern regions. Technical expertise was required for the production of MW and the mass distribution of vessels. Because the area of production and distribution was confined to the Mount Hermon and northern regions, in a maximum radius of *ca.* 70 km, it is suggested that we have here an example of case 5 of the ethnographical models described above, i.e. vessels were exchanged by a central agent simultaneously in control of a large-scale pottery production center. Distribution of MW vessels in the south was the job of middlemen who traded commodities on a small scale between the northern and the southern parts of Canaan.

C. Southern Vessels from Arad and the Negev

Definition and Sources

This section examines results of petrographic studies taking mainly into consideration the pottery groups from Arad and their presence at other sites of the Negev and Sinai.[13] Petrographic studies from Arad and the Negev carried out by Porat (e.g. 1989a, 1989b, in press) have revealed the potential of sourcing and distribution studies initiated by Glass (1978a, b).

Porat (1989a, b) identified five types or groups of pottery vessels present in the Northern Negev in EB II, i.e., vessels made of the same raw materials that were identified by petrographic analysis (Figure 3.7). Porat (in press) has identified eight clay types divided in 17 petrographic groups at Arad, presented here in Table 3.4 according to vessel morphology.

Five of these groups are germane to the present study. Additional remarks on other Arad groups from will augment the present discussion. They include three types of holemouth jar wares found at Arad and other sites in the Negev and Sinai, and groups of jugs, juglets, and jars mainly found in the Negev. The vessels are grouped according to typological characteristics and petrographic groups as follows.

Arkose Group

Globular holemouth jars used as cooking pots (eg. Amiran *et al.* 1978:Pls. 43–45; Porat 1989b: Fig.3:a) (Figure 3.7:1–2) belong to this group. Their fabrics are light gray to brown and include quartz, mica and feldspar. The temper is arkose (i.e. granite fragments and other acidic igneous rocks).

The temper and clay must have been collected from dry riverbeds (*wadis*) that drain areas where igneous rocks are found and that are devoid of sedimentary or metamorphic rocks (Glass 1978a, Porat 1989b: 174). Two areas fit with these characteristics, southern Sinai and a region south-east of the Aravah (Porat 1989b:Fig.5). The Sinai source was the favored provenance by Amiran, Beit-Arieh and Glass (1973) and Porat (*idem*) since the southern Sinai sites yielded the same holemouth jars. However arkose is also present in Transjordan (Amiran, Beit-Arieh and Glass, *idem*) and holemouths, found at Barqa el-Hatiyeh, Wadi Feinan (Fritz 1994) have recently been proved to belong to this group. They match nearby arkosic sources (Adams 1999). Therefore, it is suggested that the Wadi Feinan area is more suitable to be the source of the clay utilized in the arkosic group of holemouths, because it is closer to the sites of the Negev than those of southern Sinai.

Fossil Shells Group

Holemouth jars with globular body, flat bases, and sometimes rounded rims (e.g. Figure 3.7:3) are the most common type of vessel in this group. Clays are reddish-brown to brown with silt-size quartz, carbonate particles and iron oxides. The temper of this group is made of fossil thin and elongated shell fragments. As result of the fossilization shells have certain characteristics (quartz replaced calcite, iron oxides, stylotites, etc.; Glass 1978a, Porat, in press) which precludes their derivation at the sea shore (Porat 1989b: 175). Source of this temper are believed to be the Ora formation of Cretaceous (Turonian) origin in the southern Negev (mainly in the Uvda Valley), or central Sinai (Porat 1989a:Table 8:5; 1989b: 177, Figure 6) (and see below).

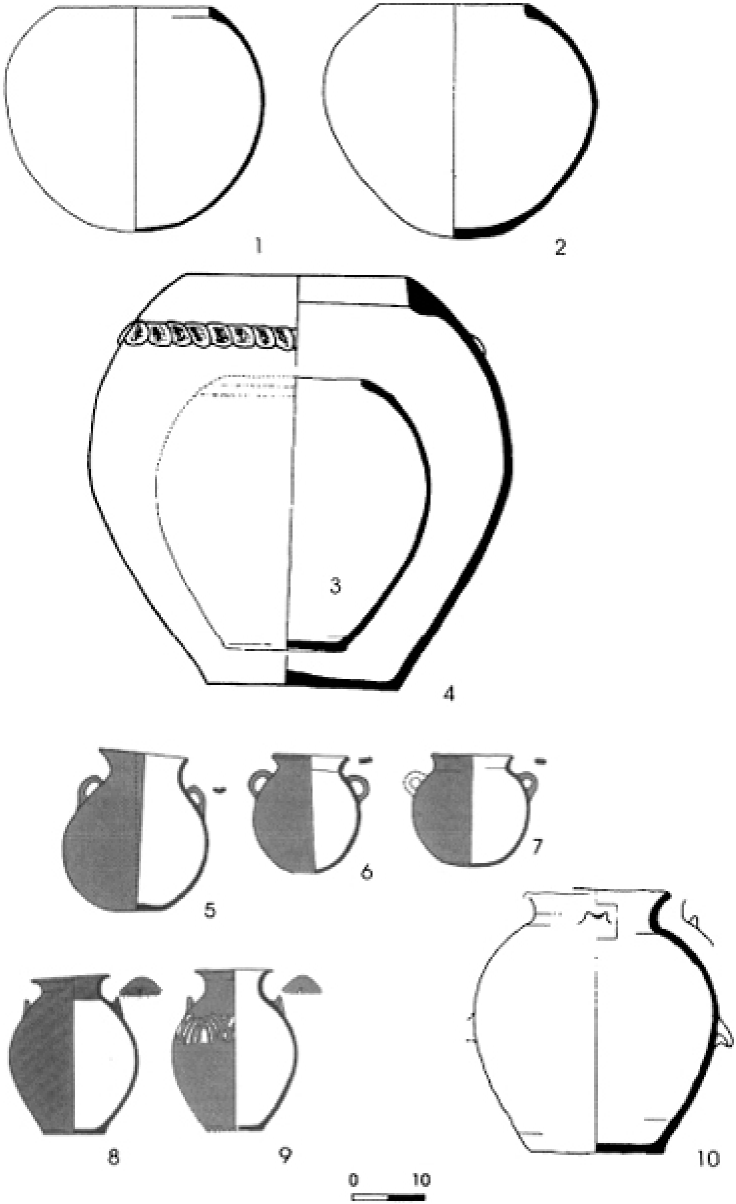


Figure 3.7 Southern pottery groups, Arad EB II. 1–2. Holemouths, Arkose group. 3. Holemouth, Fossil shells group. 4. Holemouth, Calcite group. 5–7. Amphoriskoi, Fine quartz group. 8–10. Small jars, Chert group. After Amiran *et al.* 1978, courtesy of the Israel Exploration Society.

Colcite Group

Holemouth jars, similar in shape to vessels of the previous group are the most common type in this group, but they have notably thicker walls and rims (e.g. Porat 1989b: Fig.3c). Some of them have rope decoration (Figure 3.7:4). Different types of clay were used, but in general it was calcareous, containing

Paleocene-Eocene dated microfossils. Clay could have originated in the Taqiya formation in the Northern Negev. Alternatively it could have originated from the erosion of Eocene chalk formations in the Negev. Since all these formations are found in the Negev, this group is most probably local, made at Arad and the Northern Negev sites (Porat 1989b: 178). Temper in this group includes angular calcite crystal, frequently broken along the cleavage and forming rhomb-shaped grains, with grains of coarse limestone (Porat 1989b: 177). Sources of the temper are calcite veins located in limestone and chalk, common in carbonate formations of the southern Levant.

Table 3.4 EB II petrographic groups from Arad.

Clay types	1							2		3		4	5	6	7	8	
Groups	*1a*	*1b*	*1c*	*1d*	*1e*	*1f*	*1g*	*2a*	*2b*	*3a*	*3b*	*4*	*5*	*6*	*7*	*8a*	*8b*
Pottery types																	
Platters					+												
Metallic platters																	+
Cup bowls																	
Stratum III			+														
Stratum II	+	+															
Lamps		+															
Bowls			+														
Carinated bowls																+	
Kraters			+*	+						+		+	+				
Juglets																	
Small	+																
Large		+													+		
Jugs																	
Globular	+																
Tall			+		+												
Large			+		+												
Metallic jugs																+	+
Small jars																	
Globular	+	+															
Tall					+												
Painted vessels			+							?						+	
Medium jars	?	?			?		+										
Necked jars			+					+			+				+		
Knob-handle jars		+				+		+									
Pillar-handle jars	?	?	+		+												
Pithoi			?					+									
Pink storage jars									+	?	?						
Special jars										?	?		?			+	
Holemouth jars																	
Stratum III														?			
Stratum II and I				+						?	?			+		+	
Cooking pots										+		+	+				

Note: After Porat (1989b, in press). (*)Painted krater, belong to the same group as the painted jars.

Fine Quartz Group

This group is represented by red slipped and polished amphoriskoi, juglets and bowls (e.g. Amiran, Beit-Arieh, and Glass 1973:195, Pl.49:C-F) (e.g., Figure 3.7:5–7). The clay is calcareous containing microfossils (of Paleocene-Eocene

age), rounded-deep red stains, and carbonate grains. The suitable location for the clay is the Taqyia shales located mainly in the Northern Negev. The temper is well-sorted fine-sand size quartz accompanied by some rounded limestone grains. Quartz sand could have originated in several areas within the southern Levant, but the exact source was not identified (Porat 1989b: 178, Fig. 7). Porat pointed to the Arad area as the probable origin of this group and the chert group (and see below; Porat 1989b: 178), but she also suggested that since the fine quartz group is common at Tel Halif, this site could as well be the source (Porat, in press).

Chert group

This pottery group is composed of small and medium jars with knob-handles (Figure 3.7:8–10). The calcareous clay strongly resembles that of the previous group. The temper includes, unlike the above-described group, chert fragments. Chert fragments are poorly sorted, angular and coarse. The source of this pottery group could be the same as that of the fine quartz pottery group.

Distribution

The distribution of southern wares of Arad and the Negev is presented in Table 3.5 and Figure 3.8. A somewhat lengthy description of the data and the archaeological contexts appear in Milevski 2005:70–2.

Chronology

All the southern petrographic groups presented here were found in EB II contexts, mainly Arad Stratum II, En Besor Stratum II, Tel Halif and sites of the Negev presented here. The identification of several of the small sites within the EB II in general was made on the basis of the comparison with Arad (and see Amiran, Beit-Arieh and Glass 1973; Beit-Arieh and Gophna 1976; Haiman 1990).

Table 3.5 Distribution of EB II pottery southern groups.

Sites	Groups Arkosic	Fossil shells	Calcite	Fine quartz	Chert	References
'Ai			+			Porat 1989a:Appendix 5c; 1989b:177, Fig. 2c
T. el-Hesi			+			Fargo 1979:27
T. Halif			+	+		
Arad	+	+	+*	+*	+*	Amiran *et al.* 1978:Pls. 24; 30:3, 4; 34:8;43-45; 46, 47:4,49-50;101:6,7; 103:2
E. Besor	+					Gophna 1980:Fig. 4:4-6, 8,10; 1995a:14
T. Esdar	+		+	+		Cohen 1999:37–81
K. Telem	+					Figs. 18:2, 20:3-4, 23:4-5, 27:11, 31:12-16, 36:7-8, 39:1-15; Porat 1989b:Appendix
N. Refet	+					
H. Avnon	+					
N. Boqer	+					
N. Zalzal	+					
H. Yeruham	+		+			
N. Ahdir	+				+	
R. Matred	+					Beit-Arieh 1999:Figs.12, 13; Haiman 1994:28–9
H. Horsha	+					Porat 1989b:Appendix, Haiman 1991:Fig.12:1-15
E. Kadis	+					Porat 1989b:Appendix
E. Hame'ara	+	+		+		Cohen 1999:66
K.Barnea	+					Beit-Arieh and Gophna 1981:132–3
B. el-Hatyeh	+*					Fritz 1994; Adams 1999
R. Nafha	+			+		Saidel 2002:54
B. Uvda	+	+*		+		Porat 1989a:Appendix, Figs. 2:b,d; 3:a; Avner 1990
Sheikh Muhsein	+?	+?			+	Amiran, Beit-Arieh and Glass 1973:Pl.50:B-C; 51:A;
Nabi Saleh	+?	+?				Beith-Arieh1977:92–8; 1986:29–45; Porat 1989b:Appendix

Note: (*) Sources

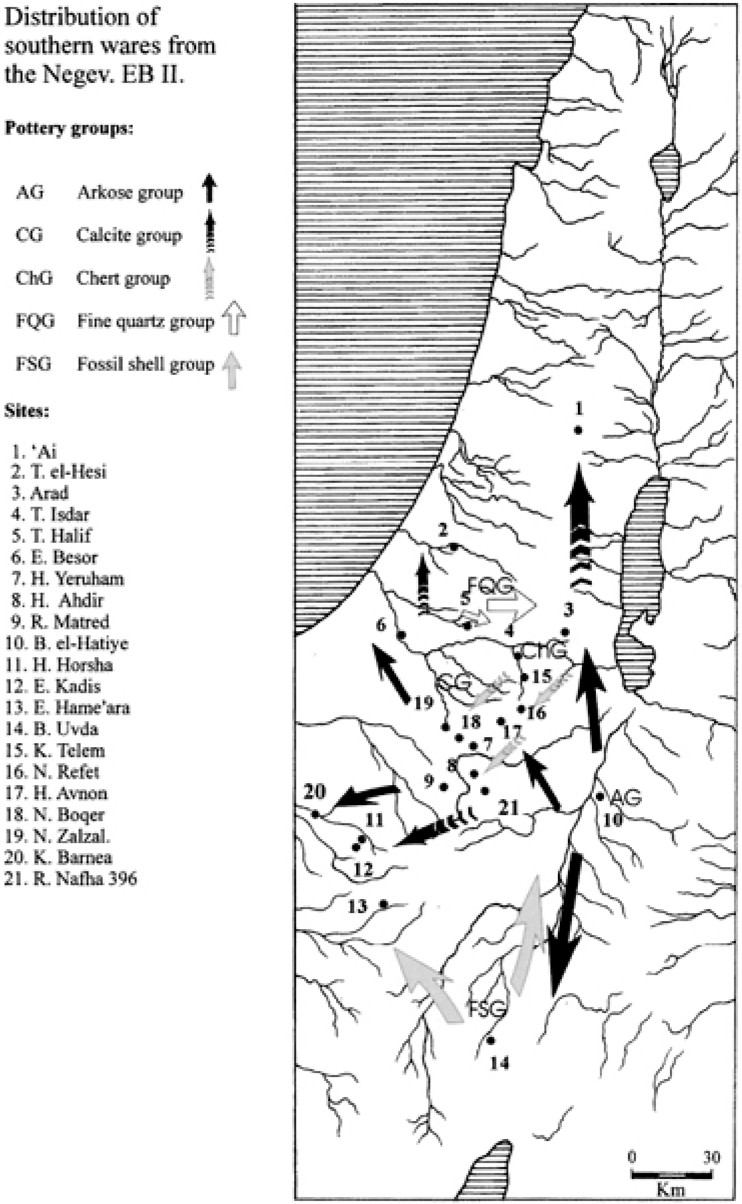


Figure 3.8 Distribution map of southern wares from the Negev, EB II.

There are, unfortunately, no radiocarbon dates for small sites in the Northern Negev and the Negev Highlands. However, there is a series of dates for the Biqat Uvda sites (Avner 1990; Sebbane *et. al.* 1993; Avner, Carmi and Segal 1994). Available determinations suggest that the pottery groups found there date to sometimes between EB I–EB III, but no further precision is possible because of limited information available. In some cases they show a long time span, some of them begin in EB I (last quarter of the fourth millennium BC), while others are dated from 3000 to 2700 BC, i.e. EB II (Sebanne *et al.*

1993:Table 1.4; Avner, Carmi and Segal 1994:Table 1). Sites 7, 9 and 16 seem to begin earlier than EB III, but they continue to exist according to these radiocarbon dates until *ca.* 2700–2500 BC In sum, nothing precludes that the pottery groups described here and found at the Biqat Uvda sites date exclusively EB II, as the same groups found in very well stratified sites like Arad, En Besor and Tel Halif.

At any rate, we cannot disregard the information that some of the changes in the composition of the vessels, mainly the holemouth groups, could reflect some internal chronology in the production and distribution of them. Therefore conclusions on the distribution and exchange of the pottery southern groups could be biased because it is assumed that all of them belong to the same time period (i.e. EB II). Notably, some of the fabric types are present at IBA sites in the area, showing some continuity in pottery traditions in spite of the existence of major differences in pottery production between the EB Age (Porat 1989b: 180–184) and the succeeding period. This could point to some sort of continuity as well in patterns of distribution in the Negev.

Discussion

A comparison of vessels according to type, function and petrographic profile suggests the existence of specialized workshops, some of them in certain large-scale production. The clays and tempers seem to have been chosen carefully in order to obtain better quality day-to-day use vessels, suggesting a high level of specialization in pottery production occurred during the EB II in the Negev.

The distribution patterns of the five studied southern groups of the Negev bear in common the fact that all of them where found at Arad in relatively large quantities. The maximum distribution distances of these groups are between 70 and 150 km from their suggested production centers. Two of them (Calcite group and Chert group) could have originated in Arad or in the near vicinity. One may have been located in the area of Tel Halif (Fine quartz group) and the other two in the areas of Wadi Feinan (Arkose group) and the Uvda Valley (Fossil shells group).

The transport of vessels took place in several directions, including the Northern Negev, the eastern Aravah and the Southern Negev. It looks as if the small sites were a sort of trading posts within the routes between Arad and the Southern Negev, and southwards to the Sinai Peninsula (Beit-Arieh 1999:90). The question is to what extent there was an exchange with Sinai.

The Arkose and Fossil shells groups are non-local to Arad, but certainly Arad played a role in the their distribution. The Arkose group probably originated in the Wadi Feinan area; perhaps Barqa el-Hatiyeh was a specific locale for a workshop producing holemouth jars of this ware. Bearing in mind that in ancient times raw materials for pottery were not traded or transported over large distances (Porat 1989b: 170), it is a much more likely candidate for the source of these vessels than sources in Sinai. Ethnographical cases discussed

above seem to confirm that raw materials are found within a maximum radius of ca. 50 km from the workshop. The fact that metallurgical ores from the sand of Wadi Feinan (and see below) seem to be the origin of the metal objects in most of the Canaanean sites (and not the Sinai sources as speculated before) seems to reinforce this conclusion about the Transjordan origin of the Arkose group.

If this interpretation is correct, the distribution of the Arkose group was northward to Arad and to the south through the Aravah Valley to Biqat Uvda, while the group reached the Negev Highlands through the Uvda Valley or via sites in the Northern Negev from Nahal Aroer and the area north of the Maktesh Ha-Gadol (the large Crater). En Besor could have been reached via Arad through the Beersheva Valley or alternatively from the sites in the Upper Nahal Habesor area (Nahal Boqer, Nahal Zalzal).

The Fossil shells group originated in the Uvda area and distribution to the Northern Negev was made probably through the Aravah Valley. This pottery group was found at only one site in the Negev mountains, Ein Hame’ara,which is the closest site in this area to Biqat Uvda.

A number of workshops most probably existed at Arad using mainly what Porat (in press) classifies as clay Types 1 and 2 (Table 3.4). Some fabrics were used in different types of vessels such as the kraters of Group 1d. These workshops probably produced the vessels which were exchanged with other regions and sites for some everyday and high-quality wares introduced to the site, including the Arkose and Fossil shells group described above (Groups 4 and 6), and a small amount of MW and Carinated bowls (Table 3.4, Groups 8a, 8b; and see below).

The Calcite group is remarkable because its distribution seems to go beyond the Negev borders, being found as north as Tel el-Hesi and Ai. The absence of this group south of the Beersheva Valley shows this northern orientation. Even if there could be several locales for these vessels, it is most probable that those found at ‘Ai arrived from Arad via one of the routes going to the north of this site. Vessels found at Tel el-Hesi could reach their ultimate destination from Tel Halif via the southern Shepelah.

The Fine quartz and Chert Groups originated in the Northern Negev, probably the Arad area. The first group was distributed to the south (following the same way as the Calcite group?) as far as the Negev Highlands and Biqat Uvda, through the Aravah Valley. The Chert Group is also present in southern Sinai, arriving there possibly through the Central Negev (Nahal Ahdir).

In light of the observations above, we suggest that a proposed extended exchange of pottery between Sinai and the Negev (e.g. Amiran, Beith-Arieh and Glass 1973; Porat 1989a) must be reconsidered.[14] Sourcing and distribution of the five southern pottery groups presented here show a clear regional phenomenon focused on the Negev and its near periphery, i.e. the eastern Aravah and the southern Shephelah.[15] We propose that groups of merchants were in charge of a central part of this exchange with Arad and Barqa el-

Hatiyeh playing important roles in it. The possibility cannot be excluded that groups of potters from sites of the Uvda Valley or middlemen did take part in this exchange.

Exchange with southern Sinai certainly existed and included pottery vessels of the Chert Group, but it must be included in a long-range trade. While this is not the subject of this volume we will return to it in Chapter 8 in a discussion on shells as a commodity of exchange. Relations between the Negev and the Central Hill Country, i.e. ‘Ai, could be part of a different kind of exchange that will also be presented below.

D. Khirbet Kerak Ware

Definition

Khirbet Kerak Ware (hereafter KKW) is considered by several scholars as belonging to an exotic ceramic tradition that is quite different from south Levantine traditions of pottery production in the EB Age (e.g. Sukenik [Yadin] 1947; Amiran 1952). This distinctive type of pottery was first noticed by Albright (1926:28; 1935:200) at the site of Bet Yerah/Khirbet Kerak (from which this pottery group takes the name) prior to excavations that began in 1944 (Maisler, Stekelis and Avi-Yonah 1952). As Amiran (1952) described this ware (Figure 3.9) shows different ceramic conceptions than those known from repertoires of the EB Age such as the decoration of the surface of vessels with highly burnished slips that range from black to red as well as molded grooving and ribbing. KKW was viewed as showing clear connections with Anatolian pottery and the distribution of this ware in Canaan was interpreted in terms of population movement. As noted by de Miroschedji (1986: 25) KKW ‘*est l’un des rares exemples dans l’archéologie du Proche-Orient ou Von a affaire incontestablement à un mouvement de population*’.

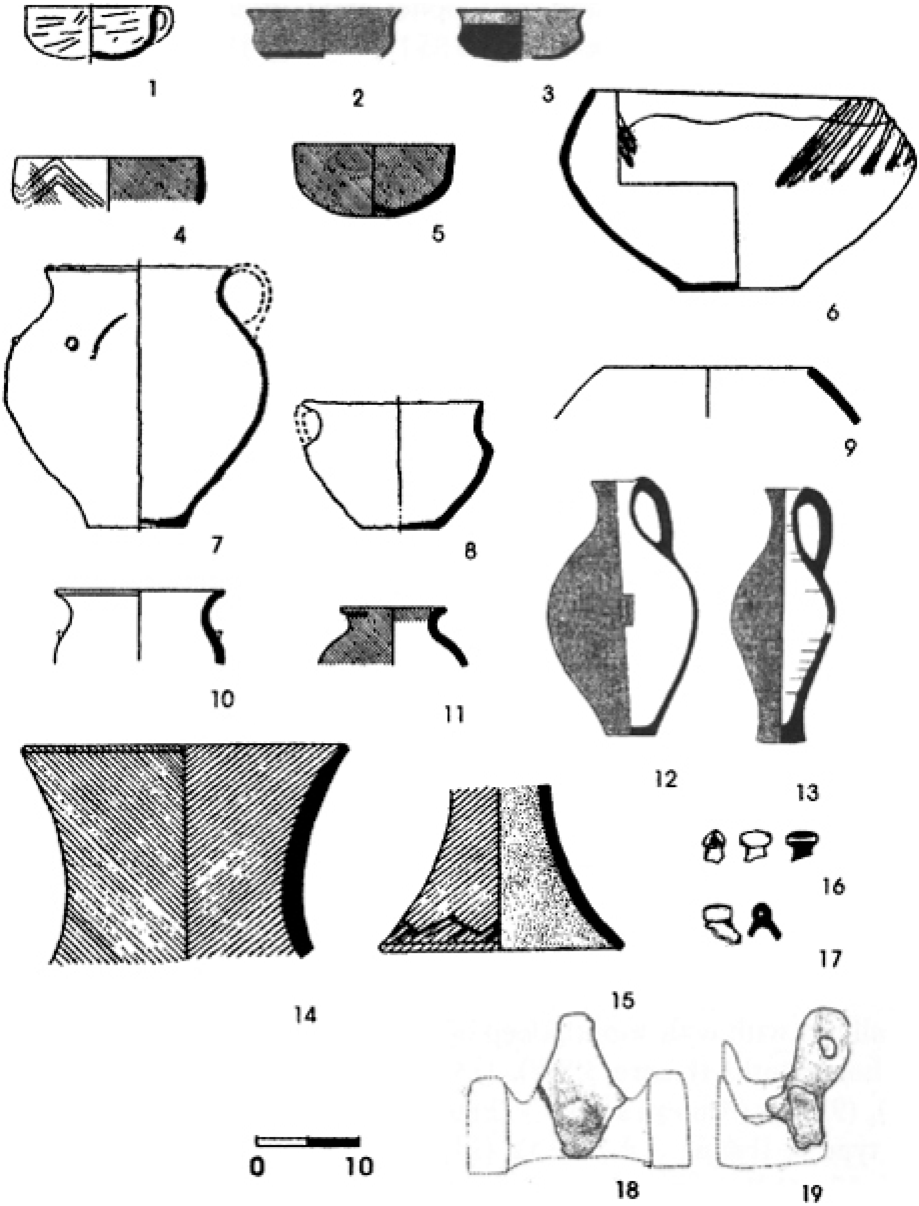


Figure 3.9 Khirbet Kerak Ware. 1. Small bowls (Type 1), Megiddo. 2. Sinuous sided bowl (Type 2), Hazor. 3. Idem, T. Yarmuth. 4–5. Hemispherical bowl (Type 3), Bet Yerah. 6. Deep bowl or krater (Type 4). 7. Jar (Type 5), Affula. 8. Idem, Jericho. 9. Holemouth jar (Type 6), Bet Yerah. 10. Cooking jar (Type 7), Bet Yerah. 11. Necked Jar (Type 8), Bet yerah. 12–13. Jugs (Type 9), Bet Yerah. 14–15. Stands (Type 10), Hazor. 16. Lid (Type 11), Hazor. 17. Idem, Bet Yerah. 18–19. Andirons (Type 12), Bet Yerah. After Amiran 1952, courtesy of the Israel Exploration Society; Greenberg 2000.

Braidwood and Braidwood (1960:519–20) and Todd (1973) considered that KKW was a manifestation of relations between the Levant and Anatolia-Transcaucasian Red-Black Burnished Ware (RBBW)[16] and a certain resurgence of the DFBW, found in the southern Levant during the Late Neolithic (and see

Gopher and Gophna 1993). In Syria this pottery appears during the Amuq H phase (Hodd 1951; Tadmor 1964) and on the coastal plain sites of Ras Shamra (de Contenson 1992; Genz 1994), Tel Sukas and Qalaat er-Rus (Ehrich 1939:72–3). It also was encountered, *inter alia*, at Hama on the Orontes (Thuesen 1988:11) and at Tel Arqa in the Lebanese coastal area (Thalmann 1991).

Explaining the distribution of this pottery prompted several theories including invasion (Callaway 1978:53–5; Amiran 1980a; Burney 1989), peaceful settlement (Kenyon 1979:110–11; Esse 1991:139–410; Stager 1992:39) or the entrance of potters into Canaan (Hennessy 1967:75; de Miroschedji 1986:26, 2000a:260). Philip (1999) has challenged these interpretations, suggesting that KKW was the result of social differentiation within south Levantine society in which certain groups utilized this ware in their activities as a sort social tag that permit us to identify them.

As noted below, NAA and petrographic analyses prove that KKW was locally made (Esse and Hopke 1986; Mazar, Ziv-Esudri and Cohen-Weinberger 2000; Zuckerman, Ziv-Esudri and Cohen-Weinberger 2009). Amiran (1968: 317) pointed out that KKW vessels are a fusion of local elements with those of its northern kin. KWW represents at least a local phase of pottery production of settlers coming from the north who continue to produce a Levantine version of RBBW. In any case this study will take into account this local phase and will not relate to the question of how the connections of KKW with its relatives in Anatolia and Syria were established.

Amiran (1952: 92–93) presented eight morphological types of KKW, while Esse (1982:Table 2) suggested a slightly different typology. Following are the main types in our view:[17] (1) small deep bowls, one handled or handleless (Amiran's Type 2, Esse's Type 1) (Figure 3.9:1), (2) small sinuous sided bowls (Amiran's Type 2, Esse's Type 3) (Figure 3.9:2–3), (3) hemispherical small and medium bowls (Amiran's type 2, Esse's type 1) (Figure 3.9:4–5), (4) large deep bowls or kraters with a bend in the middle of the wall (Amiran's Type 3, Esse's Type 4; Figure 3.9:6); (5) small jars with wide mouth/deep bowls with one handle (Amiran's Type 1) (Figure 3.9:7–8), (6) holemouths (Figure 3.9:9), (7) cooking pots (Figure 3.9:10), (8) necked jars Figure 3.9:11), (9) jugs (Amiran's Type 5 (Figure 3.9:12–13), (10) biconical stands (Amiran's type 6, Esse's type 5) (Figure 3.9:14–15), (11) knobbed lids (Amiran's type 7, Esse's type 6) (Figure 3.9:16–17), (12) andirons sometimes decorated with a modelled human face (portable hearths?) (Amiran's type 8, Esse's type 7) (Figure 3.9:18–19).

Years ago, Getzov (2006) conducted a new excavation at Bet Yerah bringing new relevant information to the subject. In Stratum II, dated to the second phase of the EB III, a complete assemblage of household ceramic vessels was discovered. In addition to the all the known forms (e.g. Greenberg and Paz 2004:Fig. 15:10–13), Getzov (Getzov, Paz and Gophna 2001: Fig. 5) found cooking pots, holemouths and necked storage jars made of KKW (our Types 8–10) (and see below Table 3.6). If we add to this information the previously

found cylindrical jar not retrieved in any other site (cf. Amiran 1989), it is clear that we are in presence of a comprehensive body, a close ceramic repertoire without any other element present in the EB III assemblages. According to Philip (1999:Table 3) KKW represent between 20 and 30% or the EB III ceramic repertoire, but Getzov (pers. comm) inform us that in his excavation KKW represents ca. 60% of the repertoire.

Level XII Bet Shean of FitzGerald's excavation (1935:5–22, Pl. X) and Mazar's Phases R11–R17 added some information about the ceramic types of KKW. At Bet Shean main types are small bowls, sinuous bowls, deep bowls, stands, and lids (our Types 1–4, 8–11) (Mazar 1997:149; Mazar, Ziv-Esudri, and Cohen-Weinberger 2000:260–5, Figs. 14.3 and 14.4). It must be stressed that according to Mazar, Ziv-Esudri, and Cohen-Weinberger (2000: Fig. 14:7), 60% of the EB III repertoire consists of KKW.

Sources

Sourcing analysis is still being researched for KKW and not as far advanced as the study of GBW and MW. Nevertheless, we have enough data to describe a pattern of distribution of this ware.

NAA (Esse and Hopke 1986:328–32; S. Pfann, pers. comm.) was done on number of sherds of KKW from the northern and southern Levant. Esse and Hopke's analyses comprise 76 samples of KKW sherds, 37 from Syrian sites, and 41 from Hazor and Bet Yerah. They show that all the samples can be classified into seven groups or clusters. The clusters were tested utilizing disjointed principal components (SIMCA) models. Three basic groups were found for the southern Levant, two for the vessels encountered at Bet Yerah ($n=23$, $n = 6$) and one for Hazor ($n = 7$). One sample from Hazor showed an overlapping between the smaller group of Bet Yerah and Hazor. At Hazor there are two sherds that show a clustering with those of Syria (Amuq sites) and two sherds from the Amuq sites show a clustering with the group from Hazor (Esse and Hopke 1986:330–1). NAA conducted by S. Pfann (pers. comm.) indicated that at least four sources existed for this ware, or that the production of this ware was performed at four sites or in their surroundings, Hazor, Bet Yerah, Bet Shean and probably Affula. Trace elements in KKW sherds from Bet Yerah and Bet Shean are very similar, as are those from Affula with Hazor (S. Pfann, pers. comm.).[18]

In a petrographic work on the material from Bet Shean, Mazar, Ziv-Esudri and Cohen-Weinberger (2000: 260–5, 270–6) concluded that KKW from Bet Shean originated in at least two workshops.[19] They distinguished nine petrographic families for the entire EB Age pottery assemblage from the site, labeled from A to I. KKW was found to mainly to families A and D. Family A was made of a carbonatic clay with up to 5% silt, and included travertine fragments of silt and sand grains as temper with rare incidences of basalt fragments. The travertine fragments suggest that this clay is found near the

site. The vessels made from this family generally are associated with coarse forms (e.g. deep bowls, called by the authors 'kraters').

By contrast, Family D is characterized by silty carbonatic clay with 10% of silty components bearing mainly quartz and minerals derived from basalt. The lack of travertine fragments indicates that this family probably originated in a locale of the Bet Shean region. Most of the small fine bowls of KKW belong to this family, but also other vessels from non-KKW (see below). Other KKW exemplars belongs to Family E, which consists of a non-carbonatic, to some extent silty clay with non-plastic components such as fine lime fragments (Mazar, Ziv-Esudri and Cohen-Weinberger 2000:271–2, Table 14.4). A KKW vessel from Khirbet ez-Zeraqon was made from similar components according to Y. Goren (quoted in Mazar, Ziv-Esudri and Cohen-Weinberger, *idem*). Furthermore, three samples of probably KKW from Kabri (Goren 1990:Table 1; Goren and Cohen-Weinberger 2003:Table 15.1), show that two of them exhibiting light tan, carbonatic clay with foraminifers probably originated in the Jezreel Valley. Another, of very silty, isotropic clay with grains of sandy quartz, similar to Family D in Bet Shean (Mazar, Ziv-Esudri and Cohen-Weinberger 2000:271) probably originated in the nearby region. Finally, there are some sites south of the central distribution area where KKW exempars were made locally (Zuckerman, Ziv-Esudri and Cohen-Weinberge. Among others, we can quote the sites of Tel Magal r Ad and Yannai, in press), Tel Yarmuth (Y. Goren pers. comm. quoted by de Miroschedji 2000a:260), and Jericho (Sala 2008; Nigro 2009).

Distribution

The distribution of KKW is shown in Table 3.6 and Figure 3.10. Aside from Bet Yerah and Bet Shean (mentioned above) the main regions where this ware was found are the Galilee, and the Jezreel Valley. It appears at the Huleh Valley, the Golan plateau, the Jordan Valley, the central Coastal Plain and the Central Hill Country as well (and see Esse 1991; Milevski 2005: 81–85).

Chronology

Wright (1937:71) suggested that KKW to be indicative of the beginning of EB III in the southern Levant. Accordingly, the appearance of KKW in a site has been defined as the beginning of the EB III. On the base of synchronisms between Canaanean material recovered from Egyptian tombs from the beginning of the EB III and the appearance of KKW, the period is understood to commence *ca.* 2700 BC (Stager 1992:41, Fig.16; Joffee 1993:68). Amiran (1968:318) concurred with Wright but further observed from excavations at 'Ai and Bet Shean that KKW continued to appear during EB HIB.

Recent information from excavations at Bet Yerah suggest that KKW only appears in a second phase of the EB III (Getzov, Paz and Gophna 2001:16).

According to Getzov, Paz and Gophna (*ibid.*) such distinction could be observed in the excavations of the Oriental Institute at Bet Yerah, where the KKW appear only in Phase A of Sounding D (Esse 1982:Pl.10:1–16). However it is possible that the first occurrences of KKW should be dated to the first phase of the EB III as at Dan (Greenberg 1996b:Fig. 3.31:4). Some KKW vessels were still in use at the beginning of the third phase of the EB III (and see below). At Bet Shean a similar distinction could be observed. The first phase of EB III lacked KKW (Phase R12 in Mazar's excavations, Mazar, Ziv-Esudri and Cohen-Weinberger 2000:269).

In addition to its early phase there is a late EB III, post-KKW phase at Hazor (Greenberg 1997a, 1997b: 191) but this phase is not clear in other sites of the north (see discussion in Getzov, Paz and Gophna 2001:17). For instance, at Bet Shean the last phase of EB III in the Mazar's excavations (Phase R7a) lacks KKW, but the authors of the pottery report (Mazar, Ziv-Esudri and Cohen-Weinberger 2001:270) are not sure that this phenomenon is not related to a functional aspect of this phase where KKW was not present and no to a chronological question.[20]

Based on new radiocarbon dates from the northern and the southern Levant, Philip and Millard (Philip 1999: Tablel; Philip and Millard 2000) suggested that 2870 BC must be indicated as the *terminus post quem* for the appearance of KKW in the southern Levant, i.e., the KKW must already have been present in the southern Levant at the end of the EB II. This interpretation of course challenges not only the evidence that in most of the cases KKW appear in a second phase of the EB III, but also that the EB III is considered to begin in the time span between 2700–2650 BC.

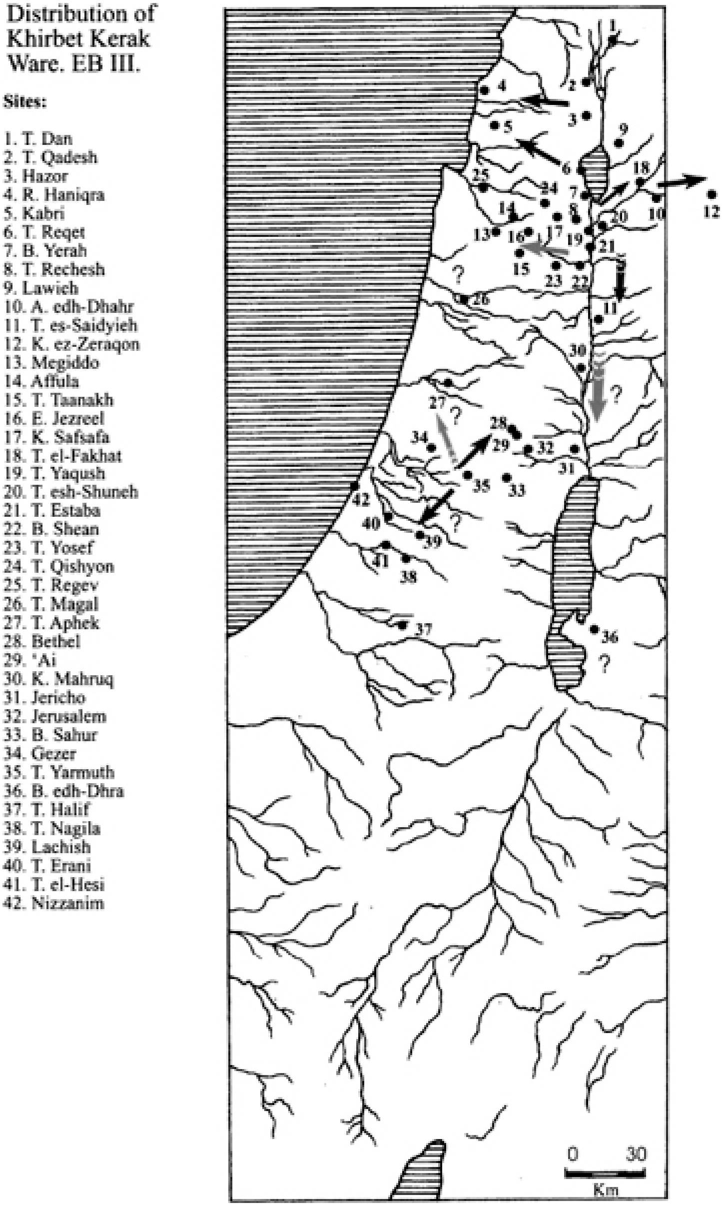


Figure 3.10 Distribution map of Khirbet Kerak Ware, EB III.

Table 3.6 Distribution of Khibet Kerak Ware types according to vessel types.

Types / *Sites*	*Small deep bowls (1)*	*Sinuous bowls (2)*	*Hemisph bowls (3)*	*Deep bowls or kraters (4)*	*Jars (5)*	*Hole-mouth jars (6)*	*Cooking Jars (7)*	*Necked jars (8)*	*Jugs (9)*	*Stands (10)*	*Lids (11)*	*Andir. (12)*	*References*
T. Dan			+										Greenberg 1996b:Fig. 3.31:4; 2000:Fig. 11.4:2
T. Qadesh	+			+							+		Aharoni (1957:10–12, Pl. 6:12, 14, 16, 17, 19; Esse 1991:97
Hazor	+		+	+						+	+		Greenberg 1997b:187–91, Figs. III.2:9-12, III.3:17-20; 2000:Fig. 11.8
R. Haniqra*													Tadmor and Prausnitz 1959; Esse 1991:96
Kabri*													Goren 1990; Table 1; Goren and Cohen-Weinberger 2003:Table 15.1
T. Reqet	?	?	?	+									Esse 1991:95
Bet Yerah	+	+	+	+	+	+	+		+	+	+	+	Getzov 2006; Greenberg *et al.* 2006
T. el-Fakhat				+									Kochavi 1996
A. edh-Dhar										+		+	Parr 1956:Nos. 208, 214
T. esh-Shuneh	+	+	+	+					+	+	+	+	Leonard 1992:50–5, Pls. 13-19; Philip 1999:43; 2001:208, Fig. 5.15
K. ez-Zeraqon	+												Ibrahim and Mittmann 1987:6; 1994:10; Genz 2002:Pls. 4:321:9, 11;38:2,5
T. es-Sa idyeh*													Tubb 1988; Tubb and Dorrel 1993, 1994; Philip 1999:35
T. Rechesh*													Y. Paz, pers. comm
K. Safsafa*													Zori 1977:113
T. Qishyon	?	+	?	+						+	+		Cohen-Arnon and Amiran1981; Esse 1991:96–7
T. Estaba*													Esse 1991:Table 4; 1993
T. Yaqush*													Esse 1991:Table 4; 1993
K. Mahruq*													Yeivin 1977b:766
Megiddo	+												Loud 1948:Pls. 106: 8, 107:27; Esse 1991:84–5
Affula	+		+	+	+				+	+	+		Sukenik 1948:11–12, Fig. 6; Pls. X, XI:1-10
T. Taanakh	+			+									Esse 1982:217, 1991:93
E. Jezreel*													Zori 1977:19
T. Jezreel*													Gophna and Shlomi 1997
T. Yosef Hayeshana*													Zori 1977:26–7
T. Bet Shean	+	+	+						+	+	+	+	Mazar, Ziv-Esudri and Cohen-Weinberger 2000
T. Magal	+		+				+						`Ad and Yannai, in press
Bethel*													Albright and Kelso 1968:22
Ai	+		+	?								+	Market-Krause 1949:Pls. LXXV:1521; LXXXI:2197, LXXXV:1261,1561; Amiran 1967; Callaway 1972:303, Fig. 73:8; 1980:193, Fig. 125:37, 40, 43, 44, 46, 47
Jericho	+	+	+	+	+								Garstang 1932, 1935; Kenyon 1960:158, 161, Figs.57:42-43; 58:6,7; 1965:96, Fig. 38:27-35; Kenyon and Holland 1982:Figs.57:15-17; 83:26-32; Sala 2008; Nigro 2009

B. edh-Dhra			+	Esse 1991:Table 4
Jerusalem*				A. de Groot, pers. comm.
B. Sahur	+			Amiran 1967
T. Aphek*				
T. Yarmuth		+	?	de Miroschedji 2000a:260; 2000b:328, Fig. 18.5:5
Lachish	+			Tufnell *et al.* 1958:57, Fig. 4: 7 [284]; Gophna and Blockman 2004:881
T. Erani		+		Brandl 1989:Fig.6:1; pers. comm
Nizzanim	+			Yekutieli and Gophna 1994:Fig. 2:7, 8
T. Nagila*				Esse 1991:Table 4
T. el-Hesi	?			Petrie 1891:Pl. 5:39,40; Fargo 1979:26
T. Halif*				Seger 1989:130, note 9; Porat 1989a:Appendix 5

Note: (*) Sites mentioning KKW without specific types

This writer does not accept these scholars' interpretation. Dates from Syrian sites are not considered relevant to the discussion because they do not affect the appearance of KKW in the southern Levant, while the conclusions based on ^{14}C dates from Tel Abu al-Kharaz, Tel Yaqush and Tel es-Saidiyeh are problematic. No KKW has been found at Tel Abu al-Kharaz (Fischer 1998) while the ^{14}C dates of Tel Yaqush (Esse 1993) are from strata dating from the EB II, previous to the occurrences of KKW. Furthermore, all the samples from Tel es-Saidiyeh and Tel Yaqush (where KKW was found in EB III) come from charcoal originating in structural timbers (Phillip and Millard 2000:283–4) that are likely to suffer from the 'old wood effect' and thus give dates that relate to the wood, but not to the date of its utilization (and see Braun 2001). Therefore, this radiocarbon evidence cannot be proof of early dating for the KKW.

Therefore, the conclusions of de Miroschedji (2000a,b) and Getzov, Paz and Gophna (2001) that indicate KKW is a phenomenon that represents a second phase of the EB III or EB IIIB seem to be the most acceptable. Nevertheless, it is possible that in some locales KKW appeared at the very end of the first phase of EB III or in EB IIIA (Greenberg 1996b).

Summary and Discussion

The analyses of the KKW—both in the northern and southern Levant—by different means show that this ware was locally made at several centers, each workshop using local clay albeit with similar technology. Distribution of this ware was mainly during the second phase of the EB III. Although KKW is interpreted here as a local phenomenon, nevertheless its foreign connections cannot be ignored. More than three decades ago, Amiran (1968:317–18) pointed out that some of the types show a fusion of local EB III elements with those of the KKW or its north Levantine kin (RBBW), and that in general local potters producing KKW were either immigrants or influenced by foreign conceptions of how to make pottery.

It is probable that at least five KKW workshops were active in the northern region. One was at Hazor, two at Bet Yerah, and two at Bet Shean. Another two workshops at Tel esh-Shuneh and Affula may also have existed.[21]

By comparison with the MW of the EB II there is a decentralization of pottery production during the second phase of the EB III (Greenberg and Porat 1996:20; Mazar, Ziv-Esudri and Cohen-Weinberger 2000:272). The pattern of distribution of the KKW is also multidirectional and to some extent similar to that of the GBW in its early phase (EB IA).

Proportions of KKW within EB III assemblages vary greatly from one site to another, including those presented as production centers. While we do not have the figures for several sites, including Tel esh-Shuneh, one of the candidates to be a production center, Bet Yerah and Hazor show a low percentage of KKW in relation to other wares (20–30%) compared to Bet Shean, where 60% of the found pottery belongs to that ware. Of course the former sites still have a very important component of KKW within their ceramic assemblages, if we compare them with Tel Yarmuth where the KKW element is about 0.01% (de Miroschedji 2000a:259).

While we are not sure about all the sources of KKW, we suggest that the distribution cores were the Lower Galilee, the Jezreel Valley and the central-northern Jordan Valley.

Hazor was the distribution center for Tel Dan and Tel Qedesh in the Huleh Valley, and probably Rosh Haniqra in Western Galilee. It is possible that Hazor exchanged KKW vessels with northern Levantine-Syrian sites, if we take in account that some of the sherds found in sites of the Amuq clustered with those of Hazor in the chemical analysis conducted by Esse and Hopke (1986:330–1), and sherds from Hazor show a clustering with those from Syria.[22]

Bet Yerah was the distribution center for the nearby area, including Tel Reqet, the Tabor region, and probably the pottery that made its way to Lawieh and Tel el-Fakhat, in the Golan. We suggest a probable maritime route to this last locale from Bet Yerah (and see Chapter 11). If our interpretation of the chemical analysis conducted by Esse and Hopke (*idem*) is correct, it is possible that vessels produced at Bet Yerah also made their way to Hazor.

Tel Bet Shean appears to be a major distribution center for the Jezreel Valley and the south of the country, while it is probable that Bet Yerah also provided vessels to sites in the Great Rift Valley as far north as Tel Rechesh, near the confluence of Nahal Tabor with Nahal Qishon. A different line of distribution appears in the Eastern Jordan Valley and the Jordan plateau. If Tel es-Shuneh was a production center, this could be the source of the KKW vessels found up to Zeraqon. Otherwise we would have to suppose that Tel Bet Shean was the provider of all or part of the KKW pottery found in Transjordan. This is suggested from the information provided by Y. Goren on the petrography of one sherd from Zeraqon, similar to that of Family E from Bet Shean (and see above the section on Sources).

To the south the Rift Valley was certainly the line of distribution of KKW as far as Jericho, and Bab edh-Drah including the Central Hill Country and the Jerusalem-Bethlehem area. The Shephelah, the Southern Coastal Plain and the Northern Negev were reached either through the *wadis* that run to the west

from the hill country or by a line going down from the Sharon plain southwards

A study of the distribution of ceramic forms should be considered when we try to understand the KKW phenomenon and its exchange patterns. Bet Yerah and Tel esh-Shuneh represent two sites with the most varied repertoire of KKW forms, followed by Hazor, Bet Yerah and Affula. This last site could also be a different center of production (as suggested by S. Pfann, pers. comm., unpublished) and the provider of the pottery found in the Jezreel Valley. But the fact that the results of the NAA samples from Affula are still unpublished precludes us from stating this view with any degree of assurance.

At any rate, it is clear that some types such as lids and andirons (our Types 9 and 10), that appear mainly in the production centers of forms did not go beyond the borders of core areas. Esse (1991:139) has suggested that because these forms are closely related to a culinary tradition, their distribution may reflect cultural boundaries (and see Hodder 1977). The only exception is an andiron from ‘Ai, found in Sanctuary A with other cult objects, that was interpreted either as a northern influence on the site (Callaway 1972:303; 1978:53–4) or simply as an indication of trade (Esse 1991:140).

Small bowls, sinuous-sided bowls and hemispherical bowls (our Types 1–3) have the largest distribution range, including the southernmost sites. All in all, these small forms were easily transported to the south because of their sizes (Esse 1991:139, de Miroschedji 2000a: 259), probably as an exotic medium as suggested by Philip (1999:50), as were the small MW forms during the EB II.

E. Other Ceramic Wares

Other ceramic wares, for which less detailed information is available, have been defined for the EB Age (and see Milevski 2005:91–105). Some of them are discussed below according to a chronological and geographical order, though we will not discuss them in depth since systematic petrographic analyses were restricted or not carried out at all. Some of the groups are limited to very small areas, as in the case of the groups of Bab edh-Dhra and Numeira.[23]

Grain Wash

This decorative technique, also referred to as ‘Band slip’ (Albright 1926:29; Glueck 1946), appears to have been a rather thin slip or wash, applied with broad brushes in vertical, diagonal, or crisscross strokes, and was named ‘Grain Wash’ (GW henceforth) by Engberg and Shipton (1934:28) (Figure 3.11:1–3). These swaths covered only parts of the vessel’s surface, leaving barren patches and creating an effect that in the opinion of some resembles wood grain. The technique was often used in storage jars and seems to have been popular in north in EB IB (Braun 1996b: 197–8).[24]

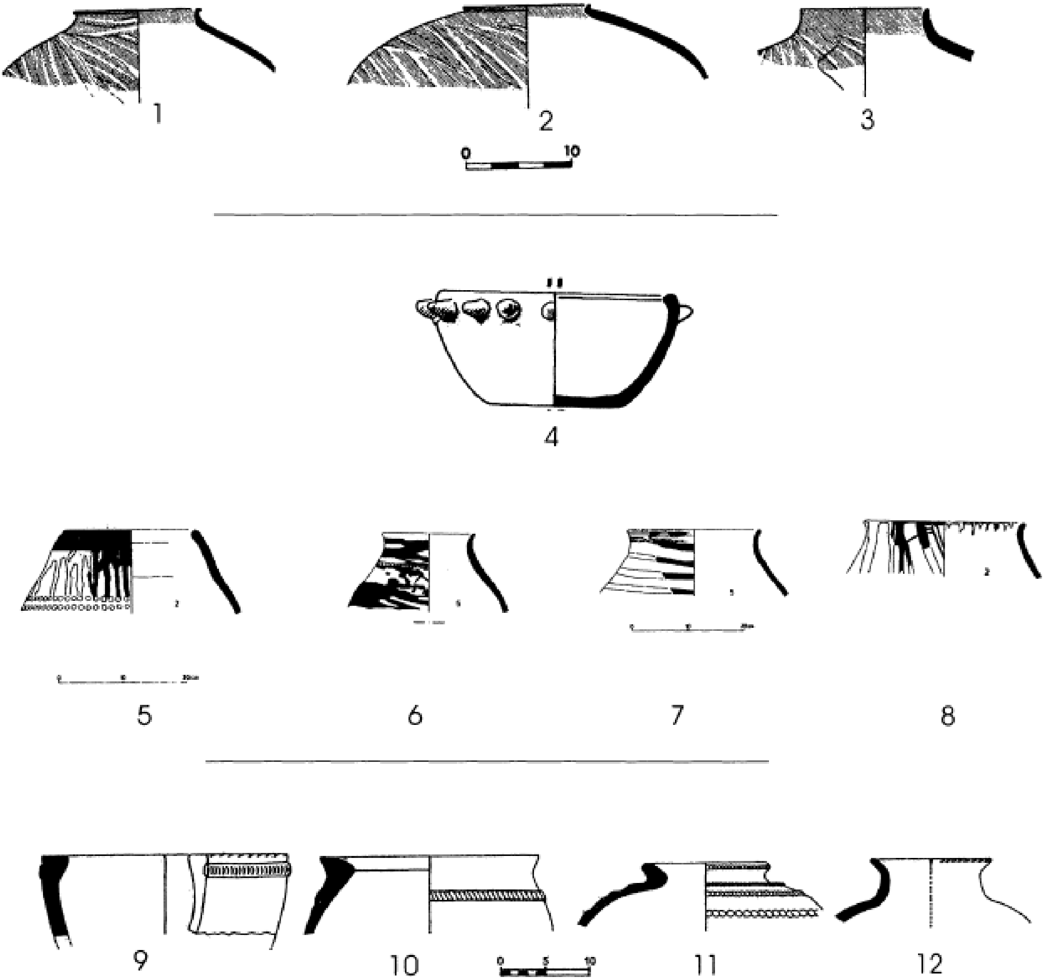


Figure 3.11 Various pottery groups. 1–3. Grain Wash, En Shadud (after Braun 1985:Fig. 20:8, 10–11). 4. 'Crackled' Ware, Bet Yerah and Megiddo (adapted from Engberg and Shipton 1934: Chart). 5–8. Splash and Drip Style Painting, T.U. Hammad (after Betts 1992:Figures 139:6, 178:5, 179:2, 180:5). 9–12. Umm Hammad Ware, T.U. Hammad (after de Miroschedji 1971 :Fig. 14).

GW is known mainly from the following regions (Table 3.7, Figure 3.12): Western Galilee, the Central Coastal Plain and the Jezreel Valley. GW appears also at the Jordan Valley, the Southern Coastal Plain, the Southern Shephelah, and even in the Judean Desert but in lesser quantities.

The only published petrographic analyses of this ware are from Kabri (Goren 1990: XLI, Table 1; Goren and Cohen-Weinberger 2003:Table 15.1). They show that it is possible that these jars were produced in an area where both carbonatic rocks and basalts existed, such as the Jezreel Valley. We suggest that GW, although in the most strict sense a treatment and not a ware, originated at least in one workshop located in the Jezreel Valley and was distributed east and westwards in the restricted area of that valley, nearby western Galilee and the area of the Jordan Valley close to the Jezreel Valley. Such a localized pattern of distribution accounts for only a very few occurrences of this

decorated style to the south.

'Crackled' Ware

This ware, also labeled 'Mottled' ware by Braun (1985:62), was described by Esse (1989b:77–8) in an article presented to Helene Kantor, who together with her co-excavator at Tel Bet Yerah, Delougaz, distinguished this ware within the pottery assemblage from the site. According to Kantor and Delougaz it is an imitation of GBW, in late contexts of EB I in the north of the country (Esse, *idem*).

'Crackled' Ware (hereafter CW) fabrics range from buff to gray with fine ground pieces of limestone with small grits of silica and grog temper. Its slips are thick and range in color from reddish-brown to dark grey. Surfaces on vessels of this ware are characterized by fine crackling lines indicating that the slip cracked either during firing or drying (Esse 1989b:80). The forms of CW ranged from shallow bowls, sometimes with vestigial handles or projections, to deep bowls with simple 'V-forms' and straight or curved rims (e.g. Figure 3.11:4).

The distribution of CW is as follows (Table 3.7, Figure 3.12): the Jezreel Valley, the Lower Galilee, and the Jordan Valley. Lesser quantities appear in the Sharon plain and the Central Hill Country.

As Esse concludes (1989b:78) the area of distribution of the CW is very restricted, even more than the GBW Families I and II, contemporaries with the CW. We see this ware as the product of a workshop located in the Jezreel Valley or in the Bet Yerah area during the EB IB that imitated the GBW earlier families of the EB IA. The cracked appearance of the CW surfaces was probably the result of the difficulties experienced by these workshops in obtaining the finer surfaces of the GBW workshop vessels (*idem*).

Splash and Drip Style Painting

Another case for our research on local exchange of pottery is that of the Splash and Drip Style Painting (SDS henceforth). This group was defined by Braun (1996b: 183) as a particular style of painting by means of splashing and ripping of red paint (Figure 3.11:5–8). SDS occurs during the early EB I or EB IA and it appears to be a local style limited to the central and southern Jordan Valley and seems to have appeared during the last part of the Chalcolithic (*idem*, Fig. VI.C.l.h.l:l, 3, 4, 6, 7) (Table 3.7, Figure 3.12).

SDS occurs during the early EB I or EB LA at sites like Tel es-Saidiyeh (Helms 1987:Fig. 15:8), Tel Abu al-Kharaz (Fischer 1994:Fig. 7:5), Tel esh-Shuneh (Gustavson-Gaube 1985: Figs. 9, 16, 14, 18), Tel Umm Hamad (e.g. Betts 1992:139:1, 2; 139:4, 5; 219:2, 7) and Jericho (Kenyon and Holland 1982: Fig.37:22; 1983:Figs. 46:4, 95:14, 126:33, 132:26, 150:2).

Table 3.7 Other ceramic groups.

Groups / *Sites*	*GW*	*CW*	*SDS*	*UHW*	*EC*	*DW LPGW*	*TAB*	*DSP*	*References*
A. edh-Dhahab	+								
Kabri	+								Goren 1990:XLI, Table 1; Scheftelowicz 2002a:100, Fig.5. 6:5-6; Goren and Cohen-Weinberger 2003:Table 15.1
B. Haemeq	+								Givon 1993:Pl.8:7-8
Qiryat Ata	+								Golani 2003:4.10:1,3; 4.13:1, 16
T.Qashish	+						+		Ben-Tor Portugali and Avissar 1981:Fig. 17:9
T.Megadim	+								S. Wolff, pers. comm.
E.Shadud	+	+							Braun 1985:61, Fig. 20:8-11, 13
Affula					+				Yekutieli 2002
G.Yonatan				?					Zori 1977:8–10, Fig. 6:2
T.Qishyon						?			
Megiddo		+							Guy 1938:Pl.3:31-32, Esse 1989b:Fig. 15.a
E. Assawir		+							Dothan 1970:Pl.6:29-30
B.Yerah		+							Esse 1989b:Figs. 13-15; 1991:324; Greenberg and Paz 2004:11
A. edh Dhahr		+							Parr 1956:Fig.14:99-101, Esse 1989:Fig.16
T. esh-Shuneh		+	+	+					Gustavson-Gaube 1985:Figs. 9, 14, 16, 18; Rowan 1993:25, 26, Fig.10; 1994:127–8;
T. Bet Shean				+			+		FitzGerald 1935:Pls. I:16, V:15; Braun 2004b:48, Fig.3.12:2, 10
E. Hanatziv		+							Amiran and Sebbane 1986:16
T.Shalem	+								Eisenberg 1996:Fig.15:13
Pella	+								Bourke 2000:237, Fig. 13.1.1-2
T. es-Saidiyeh			+						Helms 1987:Fig. 15:8
Ruweiha				+					Betts 1992:Fig.257:1-3
T. A. al-Kharaz			+				+		Fischer 1994:Fig. 7:5; 2000:Fig.12.5.4
T. U. Hammad			+	*					Betts 1992:139:1, 2; 139:4,5; 219:2, 7
T. Mefaliq				+					Leonard 1992:103–8, Pl. 36:1-6
T. Farah (N)				+			+		de Vaux and Stève 1948:Fig. 5: 9, 12-14; 1949, de Vaux 1955
`Ai					+	+	+		Marquet-Krause 1949:Pl.LXXVI:166a, LXXXII:2; Callaway 1972:Fig.3518-23; 1980:Figs. 61:35-36, 68:5-8, 90:17-18
T. Aphek	+						*		Beck 1985; 2000:94,106-107, Figs. 8.4:14,15, 8.5:3, 5-7, 16-20
T.Dalit	+				+		+		Gophna and Iron-Lublin1996:Fig.39:5-6,14
Shoham			?				+		Braun 1996b:183; van den Brink and Gophna 2005
Lod							+		Yannai and Marder 2001
Azor					+	+			Ben-Tor 1975a; Amiran 1985 Porat 1989a:Fig.8.4.A
Gezer			?		+	+			Dever *et al.* 1974:Pls.7:26; 11:34; Seger 1988:Pl. 4:1,2;
T. es-Safi							+		Beck 1985:18
Jebel Quruntul					+				Khalaily 2002:Fig. 6:4-6

Jericho (Tel)			+	+	+	+		Kenyon and Holland 1982:Fig.37:22; 1983:Figs. 46:4, 87:2, 92:12, 93:3, 95:14, 99:4, 102:1, 124:36, 126:33, 132:26, 137:34, 150:2; Stager 1990:86*
Herodian Jericho								
T. en-Nasbeh		+		+	+			McCown 1947:Pl.25:37; Wampler 1947:Pls. 10:151;52:1124; Stager 1990:86*
Jerusalem				+	+			Vincent 1911:Pl.VIII:11; Stager 1990:86*; Reich and Shukron 2004:211; R. Reich, pers. comm
M. Shalem						+?		Bar-Adon 1989:Fig.Z9: 4
Hartuv				+				Mazar and de Miroschedji 1996
R.B. Shemesh				+				E. Eisenberg, pers.comm
T. Yarmuth						+		de Miroschedji 1988:73, Pls. 21:4-6, 23:7-8, 12
Gat Guvrin				+				Braun 1996b:Table VI.E.1.e
T. Erani				+*?	+			Porat 1989a:Fig.8.4.A; Brandl 1989; Kempinski and Gilead 1991; Yekutieli 2002
H. Ptora				+				Milevski and Baumgarten 2008:Fig. 7:11-16
Lachish	+			+		+		Tufnell *et al.* 1958:161: Pls.57:44-48; 58:88-89; Gophna and Blockman 2004:876;
T. Nagila						+		Beck 1985:17
T. Halif				+	+			Porat 1989a:Fig.8.4.A; Levy *et al.* 1997:7–8, 36, Table 4
Arad					+	+		Amiran *et al.* 1978:Pl.13:31; Porat 1989a:Fig.8.4.A
S.T. Malhata					+			Porat 1989a:Fig.8.4.A
T. Mahaz					+			Porat 1989a:Fig.8.4.A
T. el-Hesi					+			Porat 1989a:Fig.8.4.A
Afridar				+				Gophna 1974:Fig. 32:4, 2002b; Baumgarten 2004:Fig.11:14
N. Besor					+			Porat 1989a:Fig.8.4.A
Site H				+				Macdonald 1932:Pls. XXXI, XXXIV)
T. Ikhbene				+	+			Porat 1989a:Fig.8.4.A; Oren and Yekutieli 1992:Fig.12:5
N.Mishmar	+			+				Bar-Adon 1980:Ills.13:6-11; 14:1?; 16:1,4
B. edh Dhra					+		*	Porat 1989a:Fig.8.4.A; Stager 1990:86*; Benyon *et al.* 1986; Schaub 1987
Numeira							*	

Notes: CW: 'Crackled' Ware (EB IB), GW:Grain Wash (EB IB), SDS: Splash and Drip Style Painting (EB IA). EC: Erani 'C' (EB IB). DW-LPGW: Dolomitic Wares—Line Painted Group Ware. TAB: 'Tel Aphek Bowls' (EB IB–II), DSP: Dead Sea Plain Tempers (EB III). (*) Sources.

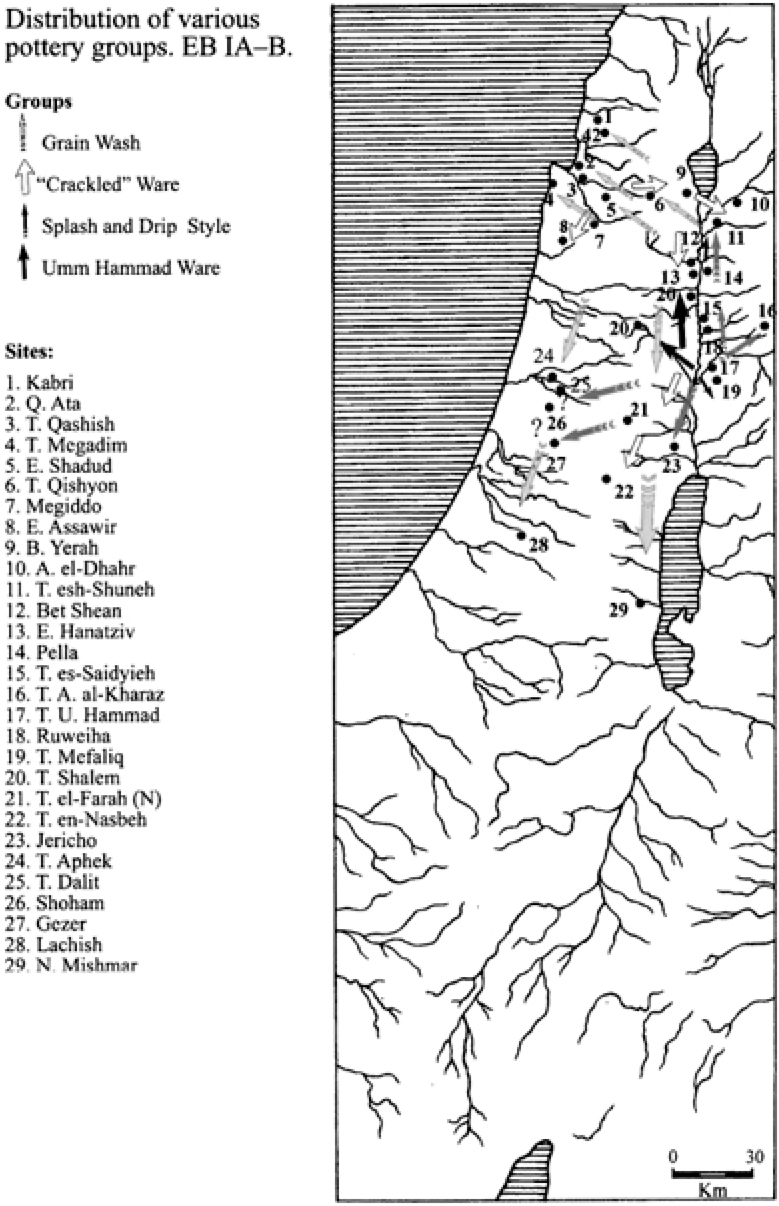


Figure 3.12 Distribution map of various pottery groups, EB IA–B.

Related SDS pottery was found at two sites located in the Shephelah: Gezer and Shoham. In these two cases the painted style resembles that of the SDS but is not the same (Seger 1988: Pl. 4:1,2; Braun, *idem*). It is possible that the group of vessels of the Shephelah is an imitation of those originated in the Jordan Valley.

SDS is concentrated in the Jordan Valley and its southernmost point is Jericho. While we don't have published petrographic analyses, we point to the central Jordan Valley, probably one of the eastern sites, as the origin of this

ware.

'Pre-Urban D' or Tel Umm Hammad Ware

'Pre-Urban D', lately called Umm Hammad Ware (UHW henceforth) was defined for the first time by de Miroschedji (1971:37–40). This is an EB IB type of highly stylized class of pottery (Figure 3.11:9–12). It was most commonly known as UHW (Betts 1992:29, 42–3, 101–13) after the site yielded it in great abundance. As Braun (1996b) has pointed out this pottery is notable for its superficially archaic aspects that make it similar to Chalcolithic types (Betts 1992:143–4) Characteristics of this ware are the use of rope decoration and large, thick, flat rims on pithoi and jars. The material is a hard fabric, dark red-brown or gray with finely detailed plastic features. Shapes include different types, jugs, medium size bowls, storage jars and pithoi (de Miroschedji 1971: 38, Fig.14).

The most acceptable suggestion is that its production was primarily associated with Tel Umm Hammad. Besides, there is evidence of it mainly at the Jordan Valley and nearby regions (Table 3.7, Figure 3.12)

'Tel Erani C' Horizon Pottery

This group was defined after Kempinski and Gilead (1991) at Tel Erani found this distinct group of vessels in Level C. Certain elements of this group continue to appear in later assemblages (and see below).

The group is characterized by its incised and applied plastic decoration, sometimes in conjunction with painted decoration. These features include longitudinal or horizontal incisions on small loop handles (Figure 3.13:1), oblique incisions arranged in bands around the neck of jars (Figure 3.13:2), and thin, circular bands of clay applied around small spouts. Some jars sometimes exhibit a whitewash with narrow, vertical red/orange painted bands (Figure 3.13:3; see Braun 1996b:94). Red burnished deep bowls with a round rim are also characteristic of this assemblage (Figure 3.13:4).

The 'Erani C' horizon (EC henceforth) should be ascribed to the EB IB, but not its latest phase, labeled by Yekutieli (2000, 2002) as EB IB1 (*ca.* 3350–3200 BC). As far as we know only one sample of this group, an incised handle from Tel Erani, was petrographically analyzed (Porat 1989b:Appendix 5c, 463). Its matrix has determined to be clay group 2, i.e. fossiliferous clay (*idem*, Pl. 1:2) with crushed limestone temper that matches with the lithological configuration of the area between Tel Erani and Lachish. This environment is the most probable place for a workshop producing these vessels.

Its source is assumed from the distribution of this group. EC vessels appear in two areas of distribution (Yekutieli 2002:74*–75*) (Table 3.7; Figure 3.14):

1.

The core is in the southern Shephelah and the contiguous coastal plain area.

2.

The second area is more peripheral and includes the Central and Southern Coastal Plain, the Central Hill Country and the Central Jordan Valley with the Judean Desert. In these regions the EC vessels appear in mixed assemblages with other pottery types of EB IB.

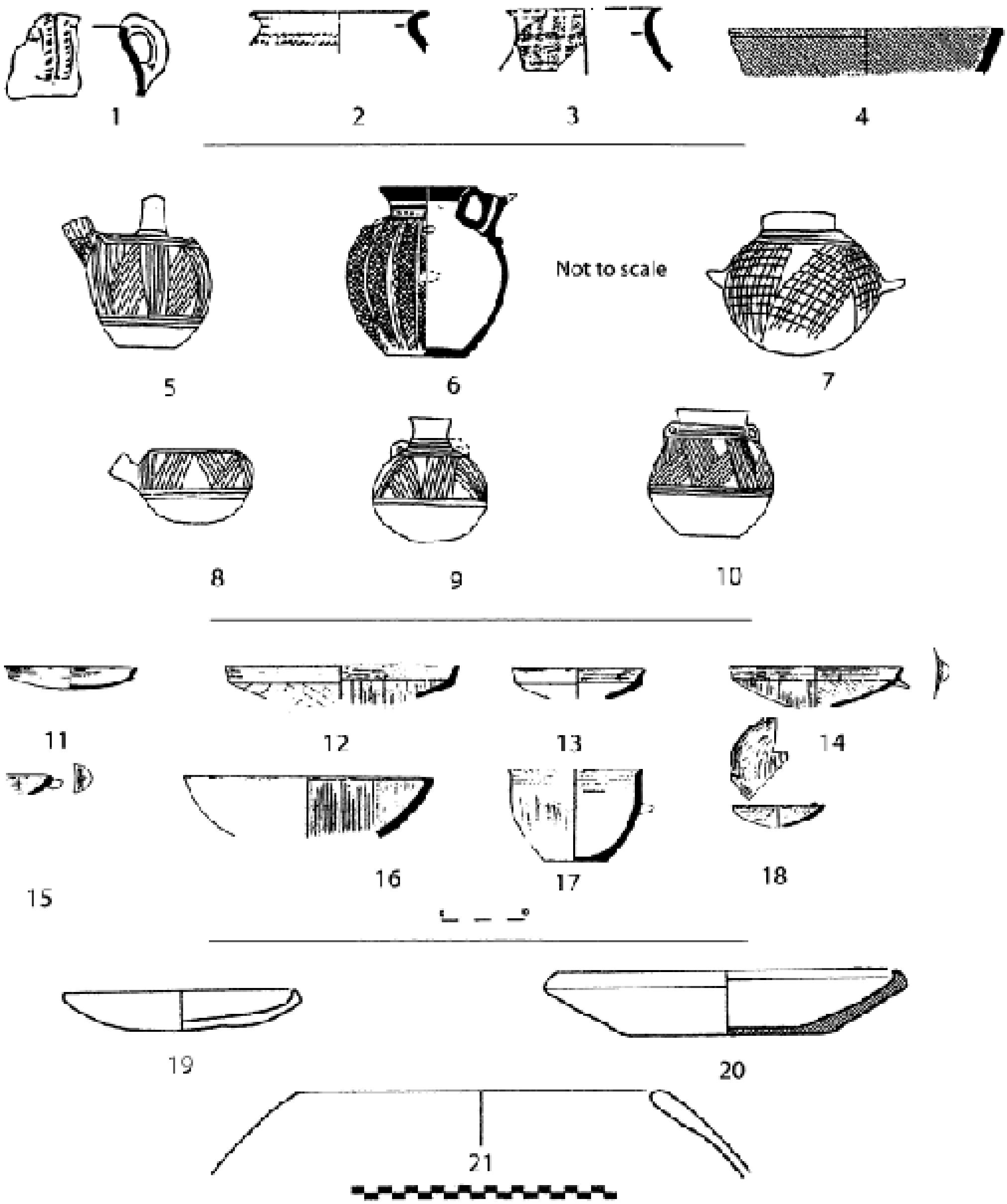


Figure 3.13 Various pottery groups. 1–4. 'Erani C' vessels (after Brandl 1989:Fig. 5:3; Kempinski and Gilead 1991 :Fig. 12:15–16, courtesy of the Institute of Archaeology, Tel Aviv University; Yekutieli 2002:Pl. 3:4. 5–10. Line Painting Group Ware, 'Ai, Bab edh-Dhra and

Jerusalem (after Stager 1990:Ill.1:E, F, G, J, L, M, courtesy of the Israel Exploration Society). 11–18. ‘Tel Aphek Bowls’, Tel Aphek (after Beck 1985:Fig. 4:1–4, 6–7, 10–11, courtesy of the Institute of Archaeology, Tel Aviv University). 19–21. Dead Sea Plain pottery. Bowl, platter and holemouth from Bab edh-Dhra (EB III) (after Rast and Schaub 2003:Figs. 11.7:2, 11.11:16, 19).

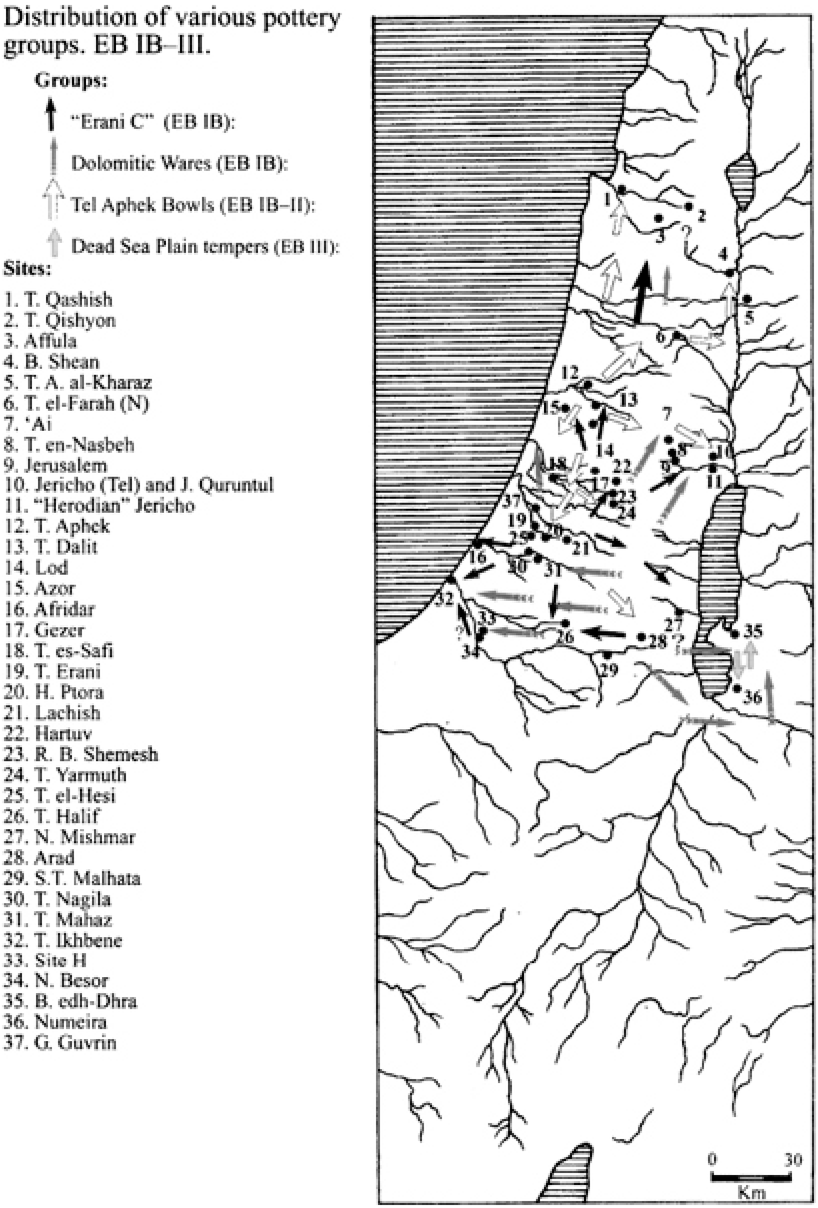


Figure 3.14 Distribution map of various pottery groups, EB IB–III.

Dolomitic Wares

Dolomitic clay and tempers were defined by Porat (1989a) as a particular group mostly present in the center-south of the country. They are distinguished by rhomb-shaped, zoned silt-size dolomite crystals (*idem*, Pl. 1:1). The use of

dolomitic clay and temper starts in the Chalcolithic and flourished during EB IB (Goren 1987). The most common vessels made of dolomitic pastes are red-striped painted storage jars with a whitewash background, a family defined by Stager (1990) as the Line-Group Painted Ware (LGPW hereafter) (e.g. Figure 3.13:5–10) in which Braun (1996b:216–19) distinguished also a Basket Style Group. However, other vessels as unpainted jars, pithoi, amphoriskoi, bowls and jugs belong to this same petrographic group (Porat 1989a:47) and it is not proved that all the line painted vessels are made of dolomitic sands, though all these groups originated in the center-south of the country and match with the clay sources of the area. Dolomitic rocks crop out in the mountains all over the country including the Galilee and the Central Hill Country (Porat 1989a:Fig. 6.1). Porat assumes that since these vessels were found mostly in central and southern Canaan, it is likely that they were produced in the Judea and Hebron hills, from nearby sources (*idem*, 48).

The distribution of dolomitic wares (DW henceforth) vessels is shown in Porat (1989a: Fig.8.4.A) (here Table 3.7, Figure 3.14) and includes only one site in Galilee, Tel Qishyon, with most of the sites localized in the center: the Central Coastal Plain, the Central Hill Country, southern Shephelah, the Northern Negev and the Dead Sea plain.

These vessels are often decorated with whitewash and red painted lines as defined in Stager's (1990:86*) LPGW Rocks of Cenomanian origin exposed 15 km northeast of that site, suggesting that the clays used in the vessels could have been brought from the source or the vessels themselves imported from a site located in the Judean or Hebron mountains (*idem*), coinciding with her earlier conclusions (Porat 1989a:48).

'Tel Aphek Bowls'

This family of bowls (henceforth TAB) was first defined by Beck (1985) on the basis of the excavations at Tel Aphek and the similarities observed there with bowls from different sites. These bowls were also known from the earlier excavations of Eitan (1969:Fig. 2:9–14, 16) at the foot of the tel. The ware of these bowls is in general very fine, ranging from a brown-reddish clay to dark brown or gray-brown. Tempers include very small grits. The finish of the vessels includes a slip with a burnish called by Hennessy (1967:73) 'pebble burnish'. Some of them were made of MW. Whatever the implications of this fact (see below), only the non-MW examples are discussed in this section.

Definition, Distribution and Chronology

From the morphological point of view there are several variants of these bowls: (a) shallow bowls with a pronounced carination (e.g. Beck 1985:Fig. 4:1–5) (Figure 3.13:11–13); (b) shallow round bowls with horizontal lug handle (e.g. *idem*, Fig.4:6) (Figure 3.13:14–15); (c) shallow bowls with inverted rim (*idem*, Fig.4:7–8) (Figure 3.13:16); (d) deep bowls with a soft carination (*idem*,

Fig.4:9–10) (Figure 3.13:17); and (e) lamp bowls, i.e. rounded bowls with patches of soot (*idem*, 23, Fig. 4:11) (Figure 3.13:18).

Petrographic and XRD analyses on some of the bowls from Tel Aphek, Tel el-Farah North, Tel Nagila and Arad were undertaken by Porat (1989a:30, appendixes 1, 2a, and 5). They reveal that the bowls contain clay Type 3 of Porat's (1989a:Pl. I:3) classification, i.e. a silty clay with well sorted quartz of eolian origin.

The distribution of TAB is presented in Table 3.7 and Figure 3.14 and and is as follows:

In the Central Coastal Plain this family is fully represented at Tel Aphek and in the Lod-Ayalon Valley. It appears also in the Lower Galilee, in the Jordan Valley and the Central Hill Country. It appears as well, in the Shephelah and the Northern Negev, albeit in lesser quantities.

This family of bowls is dated to the Late EB IB–EB II on the basis of the stratigraphy of the most important sites the bowls were found, mainly Aphek, Tel el-Farah North, Tel Dalit, Ai, Jericho and Arad.

Discussion

Beck (1985) concluded that this particular family must have been produced at one workshop because of the homogeneity of the fabric. She asserted that as far as Aphek it is the only site in which all the subtypes of the family are present and it is located in the center of the area of distribution, the workshop of the TAB must be in the site or close to it. Besides she pointed to the fact that the earlier occurrences of TAB were precisely at Tel Aphek and Tel el-Farah North (Beck 1985:25). The petrographical and XRD analyses conducted by Porat (1989a, in press) show that Beck was right since the clay type and the temper most probably originated in the area of Tel Aphek.

Furthermore, the pattern of distribution reveals that the carinated subtype is the most common of the exemplars found outside Tel Aphek, making its way to the locales farthest away such as Tel Qashish in the north and Arad in the south. Tel el-Farah North seems to get most of the subtypes. It is probable that the carinated type was in a sense most wanted because of its aesthetic value.

Technical expertise was required for the production of such well-finished TAB. The reason that some MW variants were found could be the adoption of this variant by the northern workshop of MW during EB II. The appearance of MW carinated bowls (Greenberg's type B1c) in the south, and their absence from northern sites (except Tel Dan and Tel Teo) could suggest the MW variant is an imitation or replication of the southern exemplars from Tel Aphek. However this assumption is difficult to prove since not many other MW forms were found at Aphek, and no non-MW TAB was found at Tel Dan and its vicinity, the supposed place of the MW center. Probably TAB became known to MW potters through an intermediate area (the Jezreel or Jordan Valleys?) or through the merchants that transported the bowls.

The main area of distribution of the TAB was within a maximum radius of *ca.*

90 km from Tel Aphek, with a core area of *ca.* 50 km which includes Tel el-Farah North, Jericho and the southern Shephelah. As is suggested in Figure 3.14, the main routes within this radius led to the northern part of the hill country and the Jordan Valley through dry river courses (*wadis*) and to the south through the Coastal Plain. It is also suggested that some vessels were transported through the Jordan Valley northwards. The distribution of these bowls was the job of middlemen who traded commodities on a small scale between the different parts of Canaan. However, the possibility cannot be disregarded that TAB was exchanged through merchants related to major settlements in core areas.

Dead Sea Plain Tempers

Comparative analyses of sources temper found in the pottery of Bab edh-Dhra and Numeira, in the eastern Dead Sea plain have been the object of several studies (Benyon *et al.* 1986; Schaub 1987, 1996). They enable us to recognize the exchange of pottery between these two locales during EB III. Since these sites are located very close one to another—some 15 km- (Figure 3.14), it is possible to understand them as a special study case of exchange between two sites within a limited range.

Table 3.8 Dead Sea Plain tempers.

Tempers	*Wadi Sand*				*Nubian Sand*				*Limestone*				*Basalt*			
Sites	*B1*	*SJ1*	*HM*	*J*	*B2*	*SJ2*	*HM*	*J*	*B*	*SJ3*	*HM*	*J*	*B*	*SJ*	*HM*	*J*
B. edh-Dhra	+	+			+	+					+		+			
%		42				4				26				28		
Numeira	+	+		+	+	+	+				+		+			
%		46				14				22				18		

Notes: Bab edh-Dhra (EB II—III) and Numeira (EB III). B = Bowls; Bl:Fine and plain ware, B2: Creamware; B3: Burnished platter bowls; SJ1: Fine and plain ware; SJ 2:Creamware; SJ3:Coarse ware; HM: Holemouths; J: Juglets (modified from Benyon et al. 1986:Table 1 and Schaub 1987:Fig. 1).

More than 600 sherds from both sites were analysed in thin sections, revealing the existence of five temper types for bowls, storage jars, holemouths and juglets (Benyon et al 1986: Table 1, Schaub 1987:239) (e.g. Figure 3.13: 19–21, Table 3.8). Four occur in the EB II–III; a fifth is present only in EB IB vessels of Bab edh-Dhra (Schaub 1987:247; 1996:239; Rast and Shaub 2003:357, Table 11.2). Here we will deal only with the temper types of EB III at Bab edh-Dhra and Numeira.

Wadi Sand

The most common tempering type is wadi sand consisting of rounded to sub-angular sand-sized grains of quartz, limestone and flint. The composition,

shape and size led to the assumption that the sand was collected from the Wadi Kerak or Wadi Numeira. Samples collected from these *wadis* corroborated that assumption.

Wadi sand was found mostly in fine and plain bowls and storage jars of Bab edh-Dhra from the EB IA onwards. Most date from EB III. They represent a 42% of all tempers (Schaub 1987:248). At Numeira, this temper is also common (46% of all tempers; Schaub, *idem*) being used mostly also on bowls and storage jars. We suggest that this temper is common to both sites, which produced their own vessels—both having access to the sources of wadi sand.

Nubian Sand

The second temper includes just sand-sized quartz, sub-rounded to angular shaped grains. Outcrops of Nubian sandstone matching these characteristics are found some 300 m from Numeira, while there are no outcrops in the vicinity of Bab edh-Dhra. Nubian sandstone samples were taken matching the petrographic pottery sections.

This temper is common at Numeira (14% of sherds) but not at Bab edh-Dhra (4%). It appears mainly within bowls (e.g. Benyon *et al.* 1986:Fig.6:B) and storage jars of the 'Creamware' type. The conclusion is that the vessels found at Bab edh-Dhra with Nubian sandstone inclusions were produced at Numeira.

Limestone

Crushed limestone is the third tempering type containing coarse, angular, tabular grains of fossiliferous and fine-grained limestone. This temper is most common in coarse holemouth jars (e.g. Benyon *et al.* 1986:Fig. 6:C. The petrographic profile corresponds with Mezosoic limestone present around Bab edh-Dhra in the form of cobbles and boulders form alluvial surfaces. Samples taken from these cobbles matched the petrographic sections of the pottery.

Since this tempering type occurs at both sites in relatively similar frequencies (Bab edh-Dhra 26%, Numeira 22%) it is clear that a great amount of these vessels at Numeira was acquired from the Bab edh-Dhra workshop.

Basalt

Crushed basalt temper consists of angular fragments of basalt with large crystals of plagioclase feldspar, amphibole and pyroxene. Basalt outcrops are found in the alluvial surface at Bab edh-Dhra. That material corresponds to the basalt found in the thin sections of pottery of this group. The basalt temper was found mainly in burnished platter bowls both at Bab edh-Dhra (e.g. Benyon *et al.* 1986:Fig. 6:D) and Numeira, with relatively frequent occurrences at the first site (28%) and lesser occurrences at the later site (18%). These vessels were most probably acquired from Bab edh-Dhra and brought to Numeira.

Discussion

Matching nearby tempering sources with the pottery produced and located at Bab edh-Dhra and Numeira helps us to understand part of the mechanisms of exchange between both locales. This actually is a study case *par excellence* of what Rice (1984:45) called 'micro-provenancing' research. While the utilization of local tempering sources in the pottery production has developed at Bab edh-Dhra from the EB IA onwards, only the EB III period is discussed in this work because it is the time when Numeira also existed and developed local sources for pottery.

The fact that 'Creamware' bowls and jars produced with Nubian sand at Numeira were acquired from Numeira as a different type of vessel present at Bab edh-Dhra made with Wadi sand temper, probably reflect the different value of these vessels from an aesthetic point of view. Platter bowls made of crushed basalt at Bab edh-Dhra, encountered at Numeira together with the local platters of Wadi sand tempers, could have had the same aesthetic value. Basalt tempers could possibly have helpedd to produce a better paste for burnishing (Benyon *et al.* 1986:304).

However, the coarse holemouths produced at Bab edh-Dhra from crushed limestone and exchanged to Numeira, must have a different use if we assume that holemouths from other tempers were fully in use at both sites. One of the possible functions of these holemouths as suggested by Rast and Shaub (2003:357, Table 11.8) is as cooking pots for large groups.

We do not know who performed the exchange of the pottery vessels; whether the potters or the merchants travelled from Bab edh-Dhra to Numeria or *vice-versa*, as in the examples described by Rice (1987:192–7). However it is probable that Bab edh-Dhra merchants were in control of most of the exchange since this site has a long span of existence evolving from a village during the EB I through a town during the EB II and III.

3. Summary and Discussion on Pottery Distribution

The distribution patterns between the different pottery groups both diachronically and synchronically show some remarkable differences but also similar patterns the importance of which must be stressed. EB I wares in the north, namely the different families of GBW, have multiple sources during EB IA (Families I and II) probably located within a relatively limited area. The resultant distribution of GBW indicates a multiple networks of pottery exchange within the northern region. The number of exchange networks decreases in EB IB (Families III and IV).

CW (EB IB), is more restricted with a probable workshop center in the Jezreel Valley and a net of distribution mainly to the east, passing through Bet Yerah and the Jordan Valley. GW was distributed in an opposite direction, i.e. from the east to the west, in a restricted area that includes the Jezreel Valley, the nearby western Galilee and the area of the Bet Shean Valley close to the

Jezreel Valley.

SDS and UHW, concentrated in the Jordan Valley and their southernmost point is Jericho. While we do not have published petrographic analyses of the SDS and UHW, we point to the central Jordan Valley, probably Tel Umm Hammad or one of the Transjordanian sites, as the origin of these wares.

The EC and later the TAB were wares with an eastward distribution, while these pottery groups appear also to the north and to the south of their supposed workshop's locations. The EC horizon is mainly a phenomenon of the Southern Coastal Plain and the Shephelah, while the TAB family is representative of a workshop in the Central Coastal Plain. The TAB have a radial distribution net reaching the western Jezreel valley, the Bet Shean Valley, Jericho and Arad in the northwestern Negev. DW also has a radial distribution, but with a location in the center-south of the country. Judging for this distribution pattern, it is suggested that the occurrence of DW in Tel Qishyon is probably related to a dolomitic source in the Galilee, and is not related to the central-southern sources.

Jordan Valley settlements, first and foremost Jericho, are indicated as crossing points in the exchange of the Jordan Valley wares with these above mentioned central-southern groups during the EB I.

MW represents a case of a centralized workshop in the northernmost part of Canaan. As with other wares, e.g. the EC group, the MW has a core area of distribution and a second or a third ranges of distribution in the center and southern parts of the country. We suggest that exchange with sites in the core area was controlled by the workshop or by the authorities that controlled the workshop. The distribution to other parts of the country could be the result of middlemen or other kind of merchants non-related to the production center in the north.

Southern wares of the EB II show a different pattern of exchange. There is no centralization from the point of view of a ware dominating the entire region. Arad centralized the distribution of these southern wares, producing the Calcite, Fine quartz and Chert groups and distributing the Arkosic and Fossil shells groups originated in the eastern Aravah and the Southern Negev respectively. Arad could also be a re-distributor of wares like the DW to the Dead Sea plain.

If during EB II the distribution of northern wares favored the coastal plain instead the Jordan Valley as exchange routes, in EB III the situation seems to return to the pattern of EB I, with KKW appearing as far south as the Southern Coastal Plain, the Shepelah and the Dead Sea plain. This distribution, however, could be the result of some central southern center(s) of production of KKW (also called 'local imitations') and not the product of exchange with northern centers/workshops. Future petrographic work will allow distinguish 'imported' from local KKW at central and southern regions. At any rate, the existence of several workshops and centers of KKW reflected more decentralized exchange spheres. On the other hand, each production center of KKW, as in other wares

of the EB Age, had cores of distribution (mainly in the north), and extensive secondary areas where this ware arrived by exchange.

Notes

1. The potter's wheel came from a later context but it is probably originated in not yet excavated EB strata as numerous pottery sherds dated to EB at the site.
2. Franken (1986) presented a different group of potters from the same workshop.
3. Biblical Hebrew also defines the potter as יוצר (lit. creator) as in Isa. 45:9 (יוצר חרש, lit. creator of pottery), and the pottery and pottery vessels as חמר היצר and כלי יוצר as in Isa. 29:16 and Ps. 2:9 respectively. Other references related to the process of pottery manufacture in the Bible appear in Isa. 41:25; Jer 18:3–4; 19:1; Ps. 2:9, 22:16; Job 2:8. For pottery production according to Talmudic sources see Vitto 1986.
4. And see also Dalton 1965.
5. The use of calcite, basalt or grog, for instance, increases the resistance of the vessel and reduces the porosity.
6. Miscellaneous GBW found at Afridar seem to be a different occurrence with clay sources also coming from the Samaria region.
7. But see Amiran (1969a) who indicates that this ware includes the kind painted with triangles and dots as in Arad.
8. The entire subject of EB Age sealings, a related area of research, is beyond the scope of the present work.
9. Mazzoni (1992) has proposed that jars bearing seal impressions found in Palace G at Ebla (mid-third millennium BC) were made elsewhere and collected by the central administration from peripheral localities.
10. We will give only the seal impressions found at the main excavated sites.
11. Notably, several MW vessels have made their way to Egypt, where they were discovered in tombs of the kings of Dynasty I.
12. But see below the distribution of other commodities during the EB II.
13. While we do not deal with the Sinai as a region involved in Canaanite local exchange in this work, questions related to the origin of the pottery vessels in this area require mention of finds from Sinai sites where pottery groups of the Negev appear as well.
14. This exchange certainly existed and included the pottery vessels of the Chert group and other items. We will return to this subject below.
15. On the eastern Dead Sea Plain see below.
16. On RBBW see the works by Sagona (1984, 1994).
17. We follow the system developed by Amiran (1969a), presenting in the first place open vessels and then closed vessels and going from the large forms to the smaller.
18. Unfortunately the results of the NAA were never published.
19. Chazan and Mac Govern (1984) chemically analyzed seven KKW sherds from Bet Shean (small bowls, a deep bowl and a stand) in order to study the technology of production of this ware but the conclusions on the sources of the clay were not clear.
20. Nevertheless, we have to take into account that some continuation in the use of KKW must have existed, since for instance some sherds continue to appear in the third phase of the EB III (Phase VIII) at ‘Ai if we follow the chronostratigraphic correlations by de Miroschedji (2000b:Table 18.2; but see Seger 1989:Table 1). Furthermore, at

Jericho (Tombs A and F2) KKW could continue to be active in the EB IIIC (and see Amiran 1968:318). As indicated by de Miroschedji (2000b:328) other problems arise when we take in account that in some southern sites as Tel Yarmuth there are few sherds in secure contexts or as in Tel el-Hesi where they are no stratiphied at all (Fargo 1979:26).

21. Another workshop is probably indicated by the sherd from Hazor that contained overlapping chemical components between the group of Bet Yerah and Hazor.

22. The interregional contacts with Lebanon and Syria were common, but this subject is of course outside the scope of this study (and see Henessy 1967; Esse 1982:240–1).

23. For other pottery groups see the recent work by Cohen-Weinberger (2004).

24. A different and exceptional case of GW appears in late contexts ascribed to the EB II–III at Khirbet ez-Zeraqon and other sites in the nearby area (Genz 2000; Kamlah 2000).

4

Flint Objects

Following Rosen (1997a: 106–7) we can divide the local flint industries of the EB into three main systems: the sickle blade industry, the tabular scraper industry and the *ad-hoc* industries. Since the third industry actually encompasses the production of a number of tool types, very localized and characteristic of each site, and their exchange is very difficult to follow, it is disregarded in this study, with the exception of perforators that seem to have been involved in the workshops of beads and other materials (e.g. Rosen 1997c). Other tools such as Bet Shean points (Bankirer 1999) provide very few data to delineate a distribution network. A fourth system, although non-Canaanite in origin, consists of Egyptian tools appearing during the EB I (e.g. Yeivin 1976; Rosen 1988a). It included both imported tools and probable blades manufactured in Canaan with Egyptian technology, though the cores of these blades are very few (Rosen 1997a: 108)

Among the local flint industries, the Canaanean blade industry (Rosen 1983a,c), and the tabular scraper industry, which is a continuation of the Chalcolithic tradition (Rosen 1983a,b; 1997a:71–5, 105–6), are analyzed below as they represent the best examples of flint tool exchange. In order to extract some conclusions the distribution patterns of the flint tools frequencies will be mentioned, although several methodological problems exist. The most important of them are: (1) the collection methods of flint items are far for being alike in all the excavations (both old and new) and (2) in numerous cases we do not have the figures for a comparison between the quantities of flint items and excavated volumes.

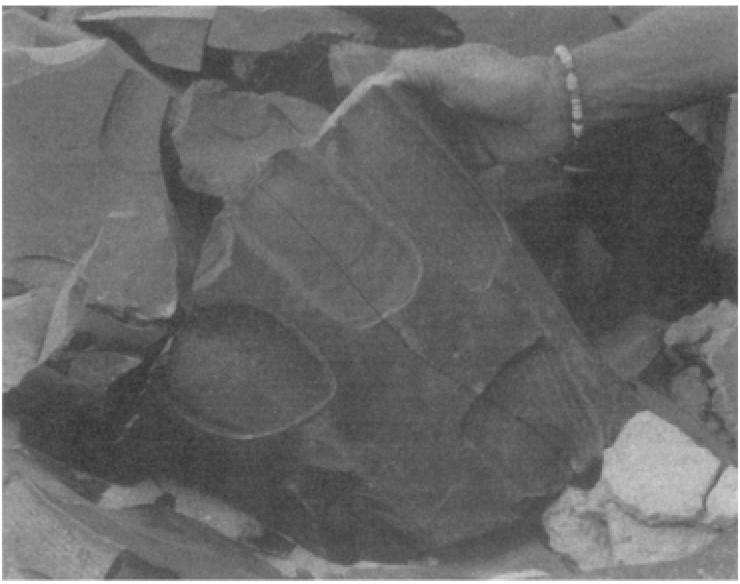
1. Raw Material and Production

From a geological point of view, our study area is dominated by Late Mesozoic and Early Cenozoic limestones that provide an ample specter of flint types (Orni and Efrat 1971:8–14). Among them the Eocene (end of the Cenozoic) outcrops are the best sources for chipped tools, due to their relative homogeneity.[1]

Although recent research has been done on flint mining and quarries, albeit from the Pleistocene and the Holocene (Wilkie and Quintero 1996; Barkai and Gopher 2001; Barkai, Gopher and Philip 2002), EB flint quarries are almost unknown in the southern Levant.

Two areas that have been surveyed in the last years may be pertinent to this discussion. Though no convincing dating relates them to the EB, one of them, Har Qeren, has been suggested by Rosen (1983b) as a source of tabular flint (Figure 4.1:1) that could have supplied the EB Age tabular scraper industry. The second area is the Jafr basin in Transjordan researched by Quintero, Wilkie and Rollefson (2002; cf. below). Besides large quarries of flint and cores from the Paleolithic period, huge blocks with the detachment of definite flakes suitable for tabular scrapers were found there (Figure 4.1:2).

1



2

Figure 4.1 Flint outcrops. 1. Har Queren tabular outcrops (courtesy of G. Laron, Hebrew University of Jerusalem). 2. Jafr basin blocks, Site J41 (courtesy of P. Wilke, L. Quintero and G. Rollefson).

No chemical analyses have been done on flint sources and implements in order to corroborate common origins of these items. Flint sources and provenance, although difficult because the material is non-homogeneous, could be established by applying trace-element analysis (Luedtke 1979).[2] Unfortunately almost no studies of this type exist for the southern Levant and the few ones available (e.g. Frachtenberg and Yellin 1992) are far from being helpful. As most of the reports of flints utilize visual identification of the raw

material, sometimes mentioning the particular source or sources, we will utilize this visual method of recognition. However, it should be remembered that ambiguities could exist when describing material and that visual criteria may vary from one researcher to another (Luedtke 1979:745–6). Besides, a change in color could exist in different parts of the same outcrops, blocks and nodules.

Unfortunately, ethnographic studies on chipped stone tools have focused more on technological and socio-ideological aspects than on production and exchange, and sometimes ground stone ethnographic examples are more available (cf. Torrence 1981:193–5). We will bring some ethnographic cases in our Summary and Discussion section of this chapter.

2. Canaanean Blades

A. Definition

Canaanean technology is a specialized blade technology existing in the EB in Canaan, although it is also known in Anatolia (Matney, Algaze and Rosen 1999; Hartenberg, Rosen and Matney 2000), Mesopotamia (Anderson, Chabot and van Gijn 2004 with bibliography therein), Lebanon (Hours 1979:59–61) and even in Iran (Valla 1978). Some decades ago, Neuville (e.g. 1930) defined this technology for the first time in Palestine. Moreover, Crowfoot (Payne) (1948: 72–9) refined Neuville's definition, giving a more precise definition of the technical aspects of the preparation of the striking platform. Rosen (1983a,c, 1997a: 46–60) studied the definition and distribution of this flint techno-typology in depth.

A survey and collection conducted in 1997 by a team from Tel Aviv University at Har Haruvim, perhaps the largest known site where Canaanean blades were produced in the country, was published as a preliminary technological study of the cores, adding the concept of 'core table flakes' (CTF) in the production of the striking platform surface (Shimelmitz, Barkai and Gopher 2000). Finally, the function of the Canaanean segments was discussed by Otte, Pelegrin and Collin (1990) as well as by Anderson, Chabot and van Gijn (2004) utilizing use wear analyses, experimental archaeology and ethnographic comparisons.

Canaanean technology is prismatic and intended for blade production, mainly for sickles and retouched blades (contra Anderson, Chabot and van Gijn, *idem*). Cores are large single platform blocks worked on one to three faces, some of them with cortex (Figure 4.2). Raw material is generally restricted to fine-grained Eocene nodules, even though coarse-grained blades were also found.

The most common tool produced from Canaanean blades is the Canaanean sickle segment, while there are also retouched blades and plain blades (Figure 4.3). For the sake of unity we will address all the Canaanean blades as one

category in the frequencies and references in the text and table.

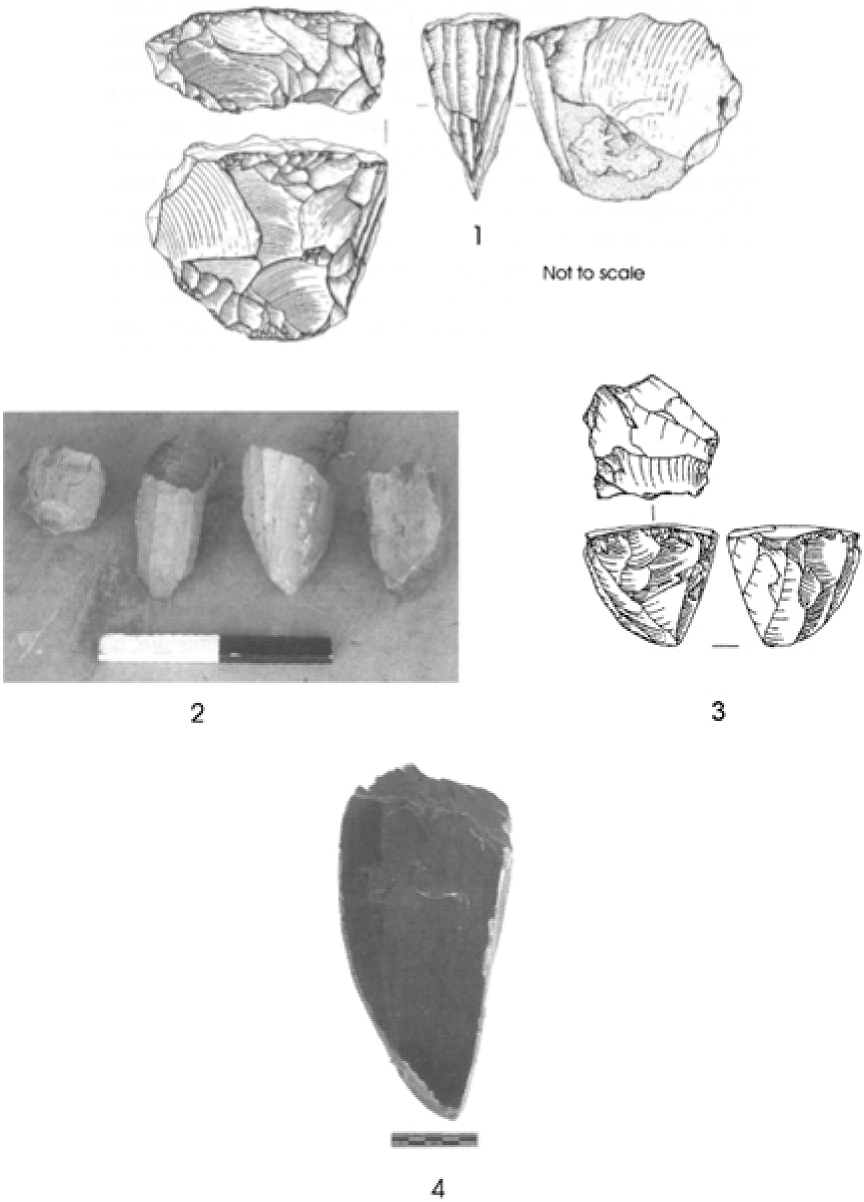


Figure 4.2 Canaanean blade cores. 1.Core from Har Haruvim (after Shimelmitz, Barkai and Gopher 2000:Fig. 3, courtesy of the Institute of Archaeology, Tel Aviv University). 2. Cores from Har Haruvim (Picture I. Milevski, courtesy of S. Mendel, En Hashofet Museum). 3. Exhausted core from E. Assawir (after Milevski *et al.* 2006) 4. Core from Fatzael (Picture I. Milevski, courtesy of the Prehistoric Branch, IAA).

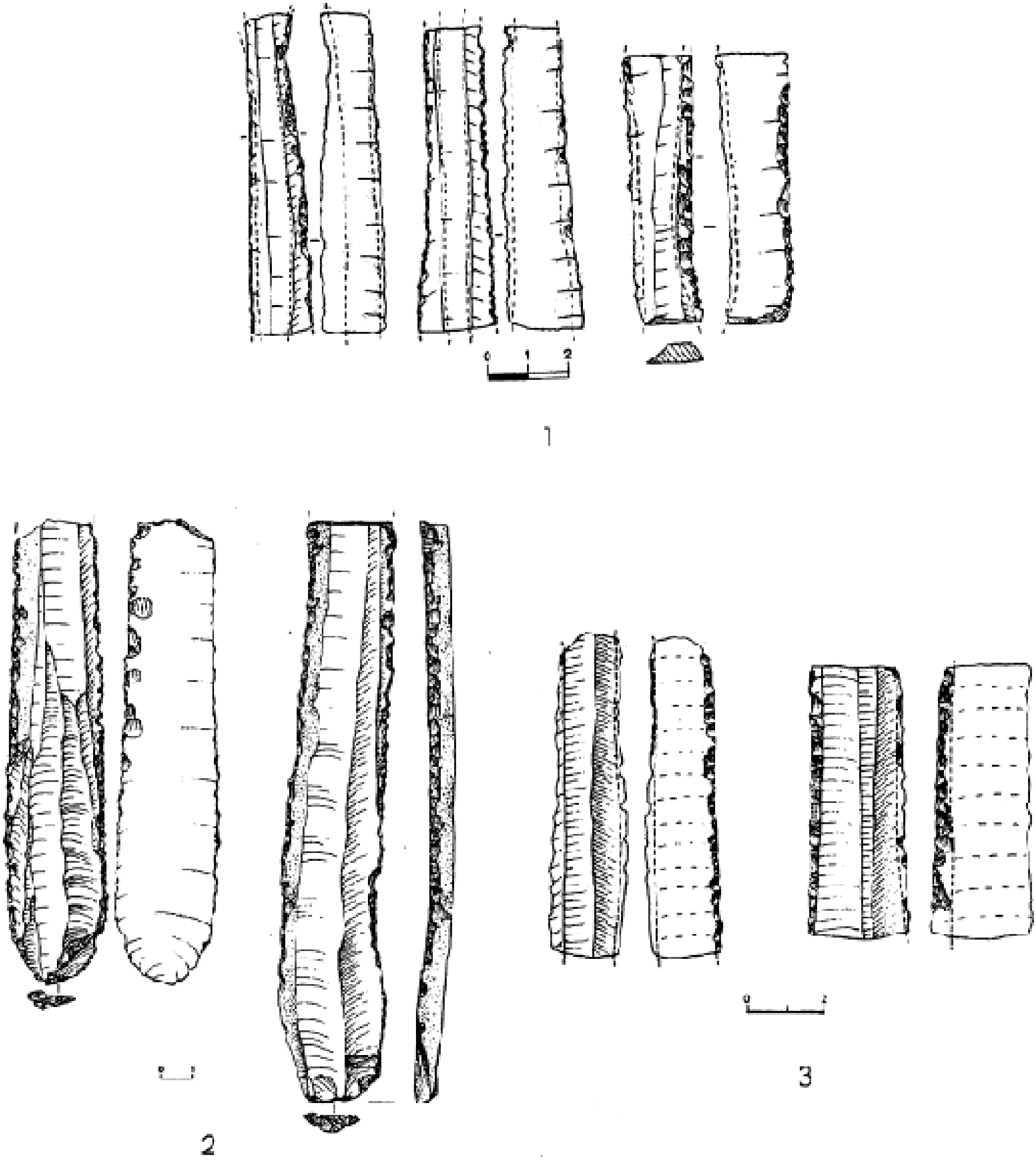


Figure 4.3 Canaanean blades. 1. Canaanean sickle blades from Horvat Illin Tahtit (after Marder, Braun and Milevski 1995:Fig. 8:5–7). 2. Canaanean retouched blades from Afridar, Area J (after Zbenovich 2004b:Fig. 7). 3. Sickle blades from Arad, Stratum III (after Schick 1978:P1. 85:6–7, 9–11, courtesy of the Israel Exploration Society).

B. Distribution of Cores

The distribution of cores for the production of Canaanean blades is presented in Table 4.1 (with bibliography) and Figure 4.4. These cores are distributed in several sites, from the most northernmost occurrence in Nahal Gush Halav (Frankel *et al.* 2001:Site 346) and Sasa, in the Upper Galilee (Frankel *et al.* 2001:Sites 289, 290)[3] to the southernmost occurrence in Tel Halif, northern

Negev (Futato 1996). Other sites are Har Haruvim (Jezreel Valley), Ein Assawir, in Wadi Ara, Fatzael (Jordan Valley), Gat Guvrin, Horvat Ptora(central coastal plain, Shephelah), Afridar (southern coastal plain), and Tel Sera[4] (northern Negev). Har Haruvim is the site where the large quantity (more than 200) of cores for Canaanean blades was found (Meyerhof 1960; Rosen 1983c; Shimelmitz, Barkai and Gopher 2000) (e.g. Figure 4.2:1–2).

Table 4.1 Distribution of Canaanean blade cores.

Sites	*EB I*	*EB I–II*	*EB III*	*EB I–III*	*Flint colour*	*References*
N.G.Halav				1	Light gray-yellowish	Frankel *et al.* 2001:Site 346
Sasa				1	Light gray-yellowish	Sasa Museum; Frankel *et al.* 2001:Sites 289, 290
H.Haruvim		Hundreds			Grayish beige	Shimelmitz, Barkai and Gopher 2000
E.Assawir	1				light gray-brown	Milevski *et al.* 2006
Fatzael				1	Dark brown	Prehistoric branch, IAA; Porat 1985
Gezer	1					Macalister (1912:126, Fig. 300)
Gat Guvrin	Dozens				Dark brown	Perrot (1961b)
H.Ptora	2				Gray, brown	Milevski and Baumgarten 2008: 614
T. Halif			7		“Chocolate”	Futato 1996
Afridar	1				Grayish brown	Khalaily 2008
Tel Sera				2	Pale brown	Central collection, IAA ; Oren 2001

C. Distribution of Canaanean Blades and Discussion

Canaanean blades are distributed widely in the southern Levant (Table 4.2, Figure 4.4) (and see Rosen 1997a; Milevski 2005:117–28). They are present in the Golan, the Galilee, the Jordan Valley, the Central and Southern Coastal, the Central Hill Country, and the Shephelah.

Canaanean blades do not extend to the Central and Southern Negev, with the exception of two blades found in the Uvda Valley. The few Canaanean blades from Bab edh-Dhra (McConaughy 1979:219; 2003:479), where most of the blades are simple or backed from local origin, support the idea that the Dead Sea Plain was also on the fringe of the distribution network.

However, a different pattern of distribution seems to have been existed in each region according to the frequencies of Canaanean blades per site. While Gamla in the Golan and Tel Qashish and Bet Yerah in the Galilee yielded large frequencies of Canaanean blades, other sites such as Tel Teo, Yiftahel and En Shadud exhibited smaller quantities. The material described at Gamla could have originated at Har Haruvim or in the Jordan Valley, although as noted above there are local sources in the Golan that could also have provided raw materials for the production of Canaanean blades in the region. The blades from Tel Kinrot and Bet Yerah could have originated at Har Haruvim as well (some 45 km to the west), although as Bankirer (2006) suggested, some exemplars could also have been acquired from Nahal Gush Halav (35 km to the northwest).

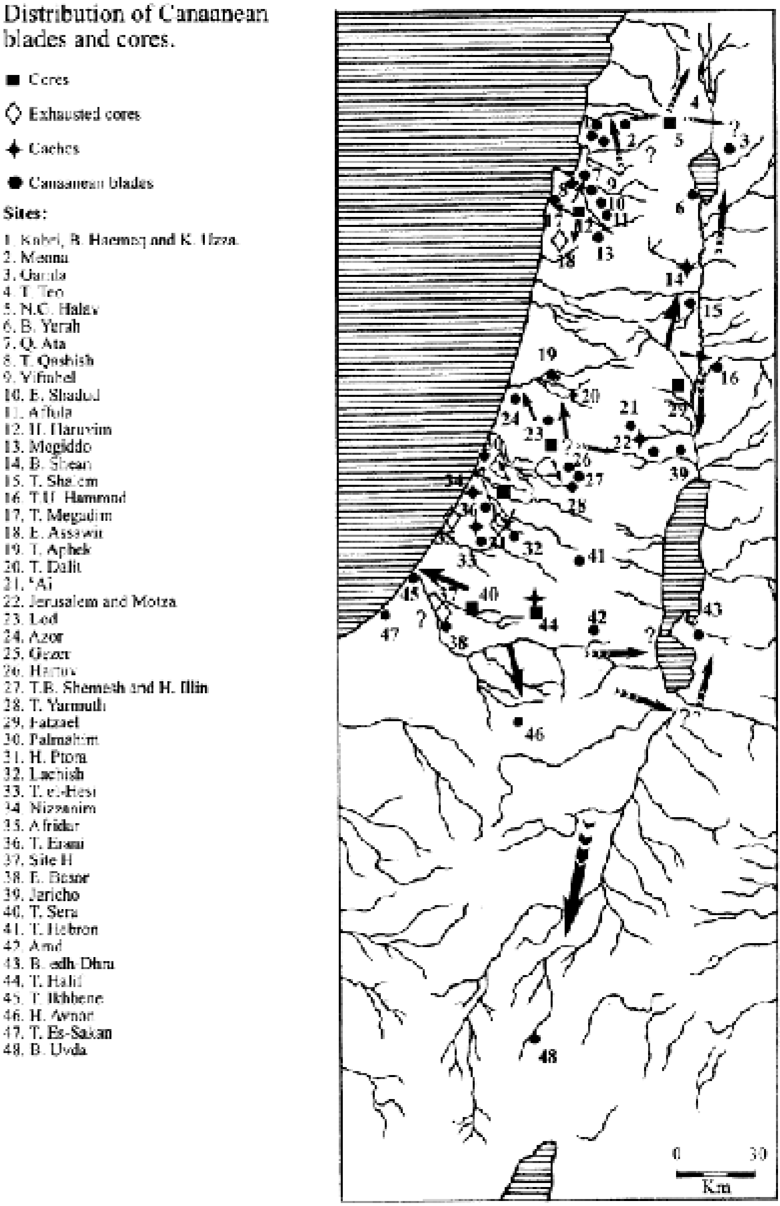


Figure 4.4 Distribution map of Canaanean blades and cores.

Table 4.2 Distribution of Canaanean blades.

	EB I		EB II		EB III		EB I–III		References
Sites	*n*	%	*n*	%	*n*	%	*n*	%	
Kabri							8***	15.4	Hershman 1990
B. Haemeq							2		Scheftelowitz 1993
K. Uzza	4+								Ben-Tor 1966:5
Meona			10	27.0					Marder 1996
Gamla							604?***	79.1	Olami 1989:Table 1
T. Dan			+						Greenberg 1996a:139, Fig. 37:3-6
T.Na ama							25		Greenberg *et al.* 1998:27–8
T.Teo	26	33.8	4	25.0					Gopher and Rosen 2001:55
B. Yerah	20	36.4	7	20.7	24	24.7			Bankirer 2006
Q. Ata	56	23.3	78	27.9					Bankirer 2003:172
T. Qashish							110	45.3	Rosen 2003a:Figs. 158, 159:1-2
Yiftahel	6	1.4							Rosen and Grinblatt 1997:134
E.Shadud	47	11.8							Rosen 1985:155
T.G. Hefer	+								Bankirer and Marder 2003.
Affula	47	20.9							Crowfoot 1946:Pl. XXVI:1-3
H. Haruvim							24***	4.1	Shimelmitz, Barkai and Gopher 2000
Megiddo	+								Garrod 1934:Figs. 21, 22:C-E; Loud 1948:Pls. 106:8-10, 107:2-3
T.B. Shean	141*	28.9	112*	19.6	58**	20.4			Bankirer and Marder 2007, in press a
T. Shalem	+								Eisenberg 1996:13, Fig. 18:1-5
T.U. Hammad							7***	11.3	Betts 1992
T. Farah (N)	+								de Vaux and Stève 1948:Pl. XVI
T. Megadim	99	10.8							Bankirer and Marder, in press b
E. Assawir	81	6.0							Milevski *et al.* 2006
T. Aphek	4	50.0	10	76.9					Mozel 2000:257–8
T. Dalit							295***	74.9	Friedmann 1996:136–9
Shoham	+								Nadelman 1998; Marder 2005
Lod	+		+						Yannai and Marder 2001; pers. observ.
Azor	14+	26.9							Ben-Tor 1975a:Fig. 13:11-12; Marder 1999
Fatzael	+								Milstein and Rosen 1985
W. Makukh	1?								Schick 1998:59–62
K. Jericho	+								Khalaily 2002
Jericho							326	11.1	Crowfoot Payne 1983:718–20
`Ai					+				Callaway 1972:Pl. XIX:4
Jerusalem							7	6.3	Rosen 1996a:259
Motza	+								Eisenberg 1993:43, 46
Gezer	26+?								Macalister 1912:Pl. CXXXVIII:3-17; Seger 1988:35, Pl. 6:8, 13-14; Rosen 1983c:22
Hartuv	14	8.9							Rosen 1996b:41, 43–4)
T.B. Shemesh							+		Grant and Wright 1938:Pl. LIV:11-15
H. Illin	119	28.7							Marder, Braun and Milevski 1995
T. Yarmuth	3?	42.9	20	66.7	27	21.7			Rosen 1988b
G. Guvrin	7?								Perrot 1961b; Khalaily and Hermon, in press

T. Erani	88?	37.0							Kempinski and Gilead 1991:180–6
H. Ptora	+								Milevski and Baumgarten 2008: 614
Lachish						49*****			Tufnell *et al.* 1958:326, Pl. 19:1, 4-6; Rosen 2004:2202, Fig. 31.1:2-6
T. el-Hesi					27	12.0			Petrie 1891:50, Pl. X: 8, 11, 13, 19; Rosen 1997a:Fig.3.17
Nizzanim	8				+				Yekutieli and Gophna 1994
Afridar									Khalaily 2004:144–52, 2008; Zbenovich 2004a,b
Area E	181	67.7							
Area F	99	28.8							
Area G	71	42.7							
Area J	36	66.7							
Area L	19	29.7							
T. Ikhbene							8	12.7	Gilead and Marder 1992
E. Besor	5	18.5	4	12.0					Gophna and Friedmann 1995:106–13
Site H	22	3.7							Roshwalb 1981:281–4, Figure H.2:5
T. es-Sakan	+				+				de Miroschedji *et al.* 2001:90, 93
T. Halif	+				+				Forshey 1987; Futato 1990; 1996:Figs. 10a, 10b
T. Hebron	24	53.3							Khalaily, in press
Arad	9	21.4	64	29.5					Schick 1978
B. edh-Dhra	2	7.7					6****	1.5	McConaughy 2003:Fig.16.2
H. Avnon			1						Cohen 1999:Fig. 32:7
B. Uvda							2		Avner 1990:128

Notes: (*)Mazar excavations, Area M, (**)Mazar excavations, Areas M and R, (***) EB I-II, (****)EB II-III, (*****) Ussishkin excavations

Unfortunately we do not have exact numbers for Megiddo, a natural candidate to have profited from the exchange of Canaanean blades, due to its proximity to Har Haruvim during EB I. Kempinski (1989b: 134) pointed out that Megiddo must have acquired Canaanean blades from Har Haruvim, suggesting that Megiddo was a point of distribution to other sites. However, there are other sites near Har Haruvim, such as Tel Qashish, that could also have held this position in the EB II. Conversely, since Tel Qashish and Megiddo are known to have existed during the EB III, when we have no proof for a settlement at Har Haruvim, it seems that another workshop must have existed in the region at that time.

Bet Shean seems to have functioned as a distribution point between the Jezreel Valley and the Jordan Valley. High frequencies are present during the EB I, II and III. The material found at Bet Shean must have originated in the Jordan Valley.

In the Shephelah, Gezer is a candidate to be a center for the production of Canaanean blades since the Eocene formation is located in the Southern Ayalon Valley, but it is difficult to draw conclusions from the fact that one single core was found there. This area could also be the source of the material of the Shephelah sites, but it is worth noting the existence of Eocene outcrops in the area between Nahal Soreq and Nahal Haela (Picard and Golani 1992), and perhaps near Tel Yarmuth, as the finding of the Eocene blocks in this site may indicate. Distribution points seem to have existed in the Central Coastal Plain. For instance Lod could have been such a distribution point between the Shephelah and centers like Tel Aphek and Tel Dalit, which show high frequencies of Canaanean blades in EB II. The Gezer area or the Shephelah could also have been the sources of blades arriving to the Central Hill Country. Alternatively, it is probable that the probable sources in the area close to Fatzael provided Canaanean blades for Jericho and westwards.

In the Southern Coastal Plain, Nizzanim, Afridar, and Tel Erani are the closest candidates for the acquirement of Canaanean blades from Gat Guvrin; they are located at 18, 20, and 2 km respectively from this site.

Finally, a Northern Negev source and workshops could have existed at Tel Halif in the EB III and other locales, if the cores found at Tel Sera represent an EB occupation at the site. This seems to be also the source for Canaanean blades from Arad, and other sites where Canaanean blades occur in small amounts during the previous EB II.

In all cases there are problems correlating the settlements where cores were found, the correspondence of flint types, and the chronology of the sites where Canaanean blades were found, with the supposed centers of production and distribution.

3. Tabular Scrapers

A. Definition

Tabular scrapers are large flakes showing cortex on almost all the dorsal surface (Figure 4.5). Also known as *racloir en éventail*, tabular scrapers were defined by Mallon, Koeppel and Neuville (1934) as a large, broad and thin flake struck from a large plaque of flint, with the cortex on the dorsal surface left intact. Usually the edge opposite the plane of percussion is retouched, giving the implement the shape of an open fan. According to Rosen (1997a:71), the retention of the cortex was an intentional technological characteristic of these tools. Although there is a relatively high degree of variability in their

shape, the most well-known are the so-called ‘fan’ scrapers (e.g. Figure 4.5:1–4, 6); oval tabular scrapers (e.g. Figure 4.5:5) are also very common (Rosen 1983b).

Tabular scrapers begin to appear in Late Neolithic contexts (Moore 1973) and they are common during the Chalcolithic (Rosen 1997a:75; Hermon 2003). In the EB they are fully represented, disappearing at the end of EB III. While continuity exists between the Chalcolithic and EB, tabular scrapers with incised motifs only appear during the EB (e.g. Schick 1978:Pls. 82, 84; Greenhut 1989; Marder, Braun and Milevski 1995:Figs. 11–13) (e.g. Figure 4.5:4–5). Macalister (1912:125–6) proposed that the incised motifs are a sign of ownership or manufacturer’s marks, and even of the development of some kind of protoalphabet. Rosen (1997a:75) has pointed out that since no tabular scrapers were found with marks in the few areas thought to be the sources of the scrapers, that theory is difficult to prove. According to the available data it seems that the marks were made outside the area of production and perhaps they indicate some kind of ownership, that eventually developed into iconographic representations, as in the case of one example from Horvat Illin (Tahtit) (Figure 4.5:4). Alternatively, the lack of incisions in the probable production areas show that they are pre-EB in date.

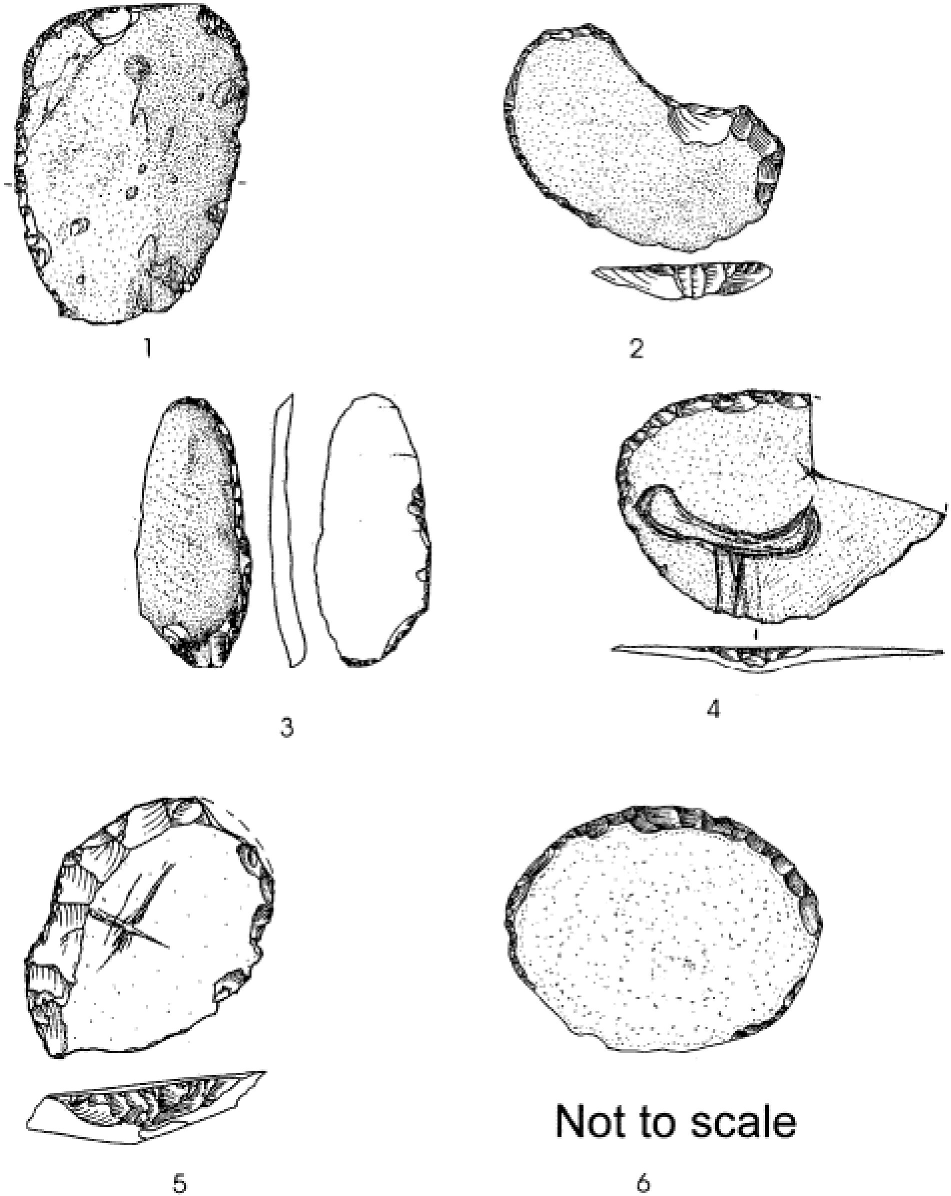


Figure 4.5 Tabular scrapers. 1. Har Qeren (after Rosen 1983b:Fig. 4). 2. Meona (after Marder 1996:Fig. 3:1). 3. Bet Yerah (after Rosen 1997a: Fig. 3.32:4). 4. Horvat Illin Tahtit (after Marder, Braun and Milevski 1995:Fig. 11:1). 5. Mitzpe Shalem (after Greenhut 1989:Fig. 15:1). 6. Arad (after Schick 1978:Pl. 84:1, courtesy of the Israel Exploration Society).

B. Sources

Rosen (1983b) has proposed that the raw material came from Har Qeren in the Central Negev from the tabular flint exposures (Figure 4.1:1), other sources were considered by him (Rosen 1997a:75). Furthermore, a flint mine complex was found in recent years in the Jafr basin area in Jordan (Quintero, Wilke and

Rollefson 2002). The area covers 12 ha and ca. 80 sites were documented. Among them there are large quarries and mines showing large blocks from which flakes, probably for scrapers, were detached (Figure 4.1:2). Unfortunately no exact dating is provided for the complex. Only one site, as far as we know, where tabular scrapers (representing almost half of the tools from the site) were found, has been excavated. It is Qa' Abu Tulayha (W), a settlement that begins in the Pottery Neolithic (Fujii 1999, 2000), but unfortunately, due to the lack of diagnostic ceramics, it is not clear that the site existed during the EB Age. Canaanean blades were not found at the site.

C. Distribution and Discussion

The distribution of tabular scrapers appears in Table 4.3 and Figure 4.6. It should be stated that no cores were found at sites together with tools. Futato (1990) has argued that some of the Canaanean blade cores found at Tel Halif could also been used for tabular scrapers, but that thesis has not been proved (cf. below).

Table 4.3 Distribution of tabular scrapers from EB sites.

	EB I		*EB I–II*		*EB II*		*EB III*		*EB I–III*		*References*
Sites	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	*n*	*%*	
K. Uzza									3+		Ben-Tor 1966
Kabri									1		Hershman 1990
Meona					3	8.1					Marder 1996
Gamla									16	2.0	Olami 1989:118*–21*, Figs. 2, 3
T. Dan					+						Greenberg 1996a:139, Fig. 37:1-2
T. Teo	4	6.2			4	30.8					Gopher and Rosen 2001:55
B. Yerah	1	1.8			10	20.4	7	11.1			Bankirer 2006:161
Q. Ata	8	3.3			9	3.2					Bankirer 2003:176
T. Qashish									13	5.3	Rosen 2003a:395–6
Yiftahel	5	1.5									Rosen and Grinblatt 1997:141
T.G. Hefer									3?		Bankirer and Marder 2003
E. Shadud	2	0.5									Rosen 1985:155
B. Haemeq											Scheftelowitz 1993
Affula	8	3.5									Crowfoot 1946:Pl. XXIV
Megiddo	2+										Garrod 1934:Fig. 23:B; Crowfoot 1946:Pls. 106-107
B. Shean	10*	2.1			18**	3.2	2***	1.2			Bankirer and Marder 2007, in press a
T.U. Hammad			8	12.9							Betts 1992
T. Farah (N)	+										de Vaux and Stève 1948:Pl. XVI.b
T. Megadim	8	0.9									Bankirer and Marder, in press b
E. Assawir	12	0.9									Milevski *et al.* 2006
T. Dalit			17	4.7							Friedmann 1996:Fig. 68:1
Jericho									9	0.3	Crowfoot Payne 1983:720–2
Jerusalem									6	5.4	Rosen 1996a:259
Shoham (N)	1	3.3									Marder 2005
Gezer									5+		Macalister 1912:Pls. CXXXVIII:30,34; CXXXIX:5, 15, 16, 21, 22; Seger 1988:35, Pl. 6:4

T.B. Shemesh								+			Grant and Wright 1938:Pl. LIV:5-10
Hartuv	3	2									Rosen 1996b:43
L.H. Illin	44	10.6									Marder, Braun and Milevski 1995
T. Yarmuth					4	13.3	14	11.2			Rosen 1988b:139–40
Azor	+										Ben-Tor 1975a:Fig. 13:13-14
Gat Guvrin	?										Khalaily and Hermon in press
T. Erani	10	4.2									Kempinski and Gilead 1991:180–6
H. Ptora	+										Milevski and Baumgarten 2008: 614
Lachish									+		Tufnell *et al.* 1958:326, Pl. 19:2, 3, 7; Rosen 2004:2209, Fig.31.1:1, 7
T. el-Hesi							1	0.4			Rosen 1983b:Table 1
Nizzanim									+		Yekutieli and Gophna 1994
Afridar											Khalaily 2004, 2008; Zbenovich 2004a,b
Area E	4	1.2									
Area F	1	0.7									
Area G	7	4.2									
Area L	2	1.0									
T. Ikhbene									1	1.6	Gilead and Marder 1992
E. Besor	*5*	*18.5*			1	3.0					Gophna and Friedmann 1995:106–17
Site H	2?										Roshwalb 1981:288, Fig. H.2:6
T. es-Sakan							+				de Miroschedji *et al.* 2001:93
T. Halif	+						+				Forshey 1987; Futato 1990, 1996:Figs. 10a, 10b
T. Hebron	7	15.6									Khalaily in press
Arad	12	28.0	77	*35.5*							Schick 1978
M.Shalem									400+	100%	Greenhut 1989
B. edh-Dhra									31****	6.7	McConaughy 2003:Fig. 16:4-8
W. Fidan 4	1										Adams 1999:120
Q.A. Tulayha (W)?									30	48.4	Fujii 1999
T. Esdar					6						Cohen 1999:Fig. 28
E. Hameara					+						Cohen 1999:66
H. Qeren ?									25	*12.5*	Rosen 1983b
R. Matred 3					71	*20.5*					Haiman 1994:30; Cohen 1999:56, 62–3
K. Barnea					2+						Beit-Arieh and Gophna 1976:Fig. 9:3, 4
N. Mitnan					10	20.0					Rosen 1993:64–6
H. Horsha					23	*29.5*					Rosen 1991:172
B. Uvda 915					4	7.1					Rosen 1990:7*; 2001
B. Uvda 917					9	10.1					

Notes: (*)Mazar excavations, Area M, (**)Mazar excavations, Areas M and R, (***) EB I–II.

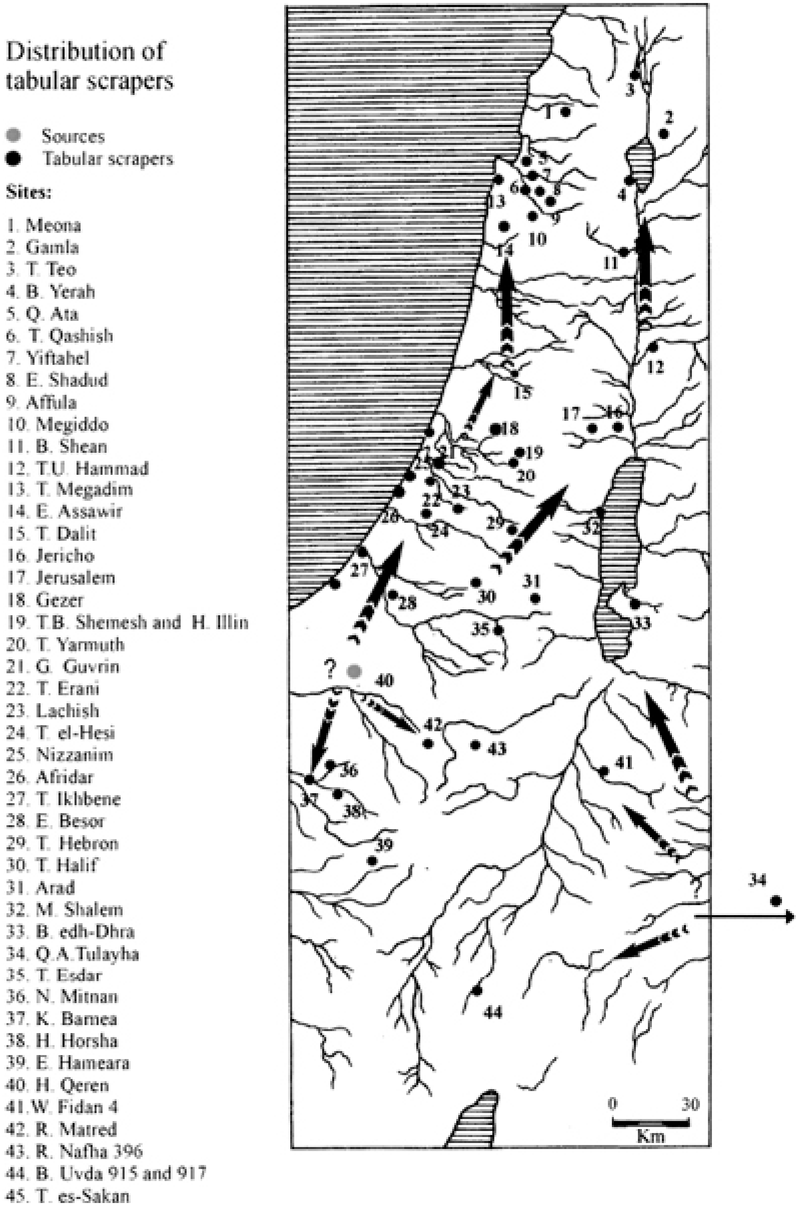


Figure 4.6 Distribution map of tabular scrapers.

Tabular scrapers are distributed mainly in the central and southern regions of the southern Levant (and see Rosen 1997a; Milevski 2005:130–6). They are poorly represented in the Golan and the Galilee. They appear in the Jordan Valley, the Central and Southern Coastal, the Central Hill Country, and the Shephelah. Main regions with tabular scrapers are the Negev, the Dead Sea plain, and the Aravah. It is notable that tabular scrapers are frequent at sites in Sinai (Gersht 2003), although a discussion of exchange with that region is beyond the scope of our research.

The absence of any debitage at almost all the sites, except from a scraper blank detached from the cortical part at Qa' Abu Tulahya (W) (which has not proven to have been active during the EB Age) shows that tabular scrapers were acquired by exchange or trade. Furthermore, no signs of finishing of blanks were found aside from a unique find at Tel Halif, where a tabular scraper blank was probably detached from the cortical part of a Canaanean core. That means that tabular scrapers arrived at sites as finished products.

Rosen (1983b) pointed out, that general frequencies of tabular scrapers decline from south to north. There is a core of sites in the Central Negev near Har Qeren, a peripheral area in the Northern Negev and Shephelah, and a third area in the north of the country. It seems that in the Southern Coastal Plain relatively few quantities of tabular scrapers existed, as the lower frequencies of sites like Nizzanim, Afridar and Taur Ikhbene show. However there are concentrations of sites with tabular scrapers in the Jezreel Valley and the Carmel region.

Aside from direct distribution of tabular scrapers in the Central Negev, the lines of distribution seems to have gone through the coastal plain, the Aravah and the Jordan Valley to the north, whether Har Qeren or the Jafr basin were the sources of the scrapers. Alternatively, it can be suggested that other unknown sources must have been existed if we consider that Meona, Bet Yerah and Tel Umm Hammad exhibit relative large frequencies of tabular scrapers.

According to the probable sources of Eocene flint used for these tools the central Jordan Valley seems a likely candidate.

Mitzpe Shalem must be seen as a probable ceremonial or special-task center, since the quantities of tabular scrapers exceed the average of all the sites, including those supposedly near the sources. That several raw materials were identified, and that most of them exhibit incisions, suggests that the scrapers were brought from several places to Mitzpe Shalem during the EB.

4. Summary and Conclusions

The exchange of Canaanean blades and tabular scrapers seems to have been controlled at the beginning by the villages close to sources. They were the centers of production of these tools. These centers seem to be located in different areas, dependent upon the sources of flint.

Tabular scrapers, as tools that originated before the EB, have a previous network of distribution. While no exact dates for the two known sources are available—Har Qeren and the Jafr basin—it is most probable that they began to produce them prior to the EB Age, as incised tabular scrapers were not found at these locales. Rosen's (1983b) thesis suggesting a gradual decrease of tabular scrapers within the flint assemblages from south to north has, in general, been corroborated. However, it is probable that other sources existed for these tools and therefore, a northern source may account for a relatively large number of

such tools found at sites in the Galilee, the Jezreel and Jordan Valleys.

Sources for Canaanean blades cores are more clearly identified, and the network of distribution of blades has at least three stages, according to the information described above. The first stage is represented by production centers, knapping workshops near the flint sources. Har Haruvim and Gat Guvrin are the key sites in this stage, but there must have been others, judging from the distribution and raw material of the cores found at other sites.

The second stage is the allocation of blades in distribution centers, whether in finished forms as sickle blades or as blank blades. At some sites (Bet Shean, Motza, Horvat Ptora, Nizzanim, Tel Halif), caches of blades have been found in EB I, EB II and EB III contexts, indicating either the existence of such distribution points or intra-site differentiation in the utilization of such blades. At Tel Gat Hefer (Covello-Paran 2003) and Horvat Illin (Tahtit) (Braun and Milevski 1993) blades were found concentrated in specific locales such as rooms.

The third stage in the circulation is represented by exhausted or recycled cores found at several sites that could indicate a phase of secondary knapping for the cores. The EB II cores of Har Haruvim and the EB III cores found at Tel Halif suggest two different networks in the urban phases of the EB, with some workshops in locales that are close to sources.

The large centers, however, are totally devoid of workshops in most of the cases, judging from the fact that no cores were found at other EB II–III urban sites. It appears then that these centers controlled the workshops that existed in the villages or close to the sources. The fourth stage in the circulation network of Canaanean blades is represented by the distribution to other sites from these locales. While the first, second and third stages occurred in a radius of *ca.* 20 km, the fourth stage could occur within a radius of 50 km or more.

For tabular scrapers, the data show that as we move away from the probable sources the frequencies of these tools decrease. We suggest that the flint workshops were close to the sources, and that they ‘sold’ the tools to middlemen who brought the commodities to a third center, where the tools were again exchanged and distributed. The secondary centers were called by Rosen (1997a: 109) secondary workshops, and are more visible in the Chalcolithic period at sites such Nahal Habesor (Site A) (Roshwalb 1981:39). EB II–III urban centers could also have been re-distributors of the tabular scrapers. This could be the reason for some relative high frequencies during the EB II at sites such as Arad and Bet Yerah.

Ethnographic examples showing different ways of exploitation and distribution of chipped tools can suggest some ideas of how our tools were distributed. In a study on modern production of obsidian tools in the Ethiopian Rift Valley, Gallagher (1977:408) describes quarries up to a half-day’s walk from the village. In the quarries they produce blanks and carry them to the village in order to produce tools. The blanks are made in order to minimize burdens that have to be carried. People of the villages closest to the quarry are

involved in some trading of obsidian to those who live in more distant locations (*idem*, 410).

An example of obsidian procurement and production in Idaho, North America, show that while the Northern Paiute, who live near the sources, produced arrow-heads for exchange purposes with other groups that came to the region, the Nez Percé procured obsidian directly from the sources (Sappington 1984:24–5).

In Indonesia, the inhabitants of zones of extraction of different materials used for axe and adze production are the owners of the quarries. A quarry located at a distance of more than four days' walk is difficult to defend, and for this reason the villages that control the quarries are the closest ones (Pétrequin and Pétrequin 2000:358–9). The extraction and selection is done in quarries, while blocks are transported to villages in a collective effort of the members of the community (*idem*, 364–6). The exchange of axes and adzes has two systems. One is ceremonial, in which tools are given in exchange for other products on the occasion of a ceremonial visit. The second is on a more individual basis, with people exchanging other products in the village and taking the axes and adzes dozens of kilometers away (*idem*, 388–9).

We suggest that the exchange model for Canaanean blades and tabular scrapers could well be analogous to some of the examples in the method of procurement, locale of production and form of distribution. Mitzpe Shalem could have served as a kind of ceremonial or exchange center.

The ethnographic examples presented here show a control of settlements close to sources and transportation of blocks or nodules to workshops, while waste and debris is left in quarries. In both cases, Canaanean blades and tabular scrapers have a 'down-the-line' model of exchange as proposed by Renfrew (1975). In this model a commodity travels successive settlements and regions through successive exchanges.

In spite of the tentative conclusions suggested here, it is important that further investigation will consider the subject of distribution systems anew when more quantitative data become available. For instance, at present we are very far from knowing the approximate production capabilities of EB workshops by which we may compare quantities of tools yielded in these locales and the amounts of tools found at different sites.

The data provided in Tables 4.1–4.3 represent a very small part of the Canaanean items and tabular scrapers. It must be emphasized that to date, no Canaanean blade workshop has been excavated. If we consider research by Shimelmitz, Barkai and Gopher (2000), the relation between cores and Canaanean blades at probable workshop sites is almost 1:1. However, this statistic is problematic because of two inherent biases: (1) these are surface finds and not the yield of excavated locales; (2) it is expected that in a workshop cores and waste will be found in greater frequencies than tools, since these were transported for exchange outside the workshop. An example of this is found at Titris Hoyuk in Turkey. A flint tool workshop yielded some 3,000

items, including 1,600 cores and other debitage elements, but only 29 Canaanean blades were found (Hartenberger, Rosen and Matney 2000:55–6). Since the workshop is located in one of the suburbs of an urban settlement, this situation can be explained by the fact that most of the blades were removed from the workshop to other households in the city and/or other sites in the region. Differently, a Chalcolithic workshop recently excavated at Beersheva (Bet Eshel) has revealed between 1,500 and 2,000 cores, mostly for blade production and thousands of blades (Gilead *et al.* 2004:252: Fig. 7). At Qa' Abu Tulayha the relation of cores to tabular scrapers found in Structure 03 (a probable workshop) is *ca.* 1:4, which seems to be more consistent with the expected results of an *in situ* workshop.

Furthermore, research on production quantities of flint tools in Mesoamerica calculated that 150 tools per year were made by males (Johnson 1996:163). These tools had a distribution radius of 50 km (McAnany 1989), representing millions of tools, but these numbers could change dependent upon technological, geographical and historical conditions. At any rate, the quantities of Cananean blades and tabular scrapers found at EB sites do not match the quantities of cores and for this reason all the conclusions on the exchange of these tools will need to be reconsidered when and if new data become available.

Notes

1. In Egypt, Eocenian flint was also especially sought after for chipped tools. For instance, Eocenian flint mines were quarried in Wadi el-Sheikh, *ca.* 100 km south of Cairo (Weisberger 1982). Different techniques were used during the Neolithic and historical times in order to obtain the raw material. The workmen utilized simple pits a few centimeters deep, and there is a 2-meters-long trench. Tunnels with a diameter up to 1.5 m, a length of 8.00 m, located at a depth of *ca.* 4.00 m were also found. The debitage found near the mines is a testimony that a workshop existed at the site (Vermesch 1997).
2. Flint is composed of 70% to 99% of silicon dioxide (SiO_2) and has oxides of calcium, carbon, iron, potassium, aluminum and magnesium, among other impurities. These and other elements are the so-called trace elements which could reflect the original sources of the flints (Luedke, *idem*).
3. The cores are housed in the collection of the Museum of Kibbutz Sasa. The cores were collected by amateur archaeologists decades ago but their find spot is not clear (H. Smithline, pers. comm.).
4. I thank Zinovi Matskevich for this information

5

Groundstone Tools and Vessels

1. Technological and Ethnohistorical Introduction

The following section addresses aspects of sources and distribution patterns of ground stone objects, mainly made of basalt. Sandstone, beach-rock and *kurkar* artifacts are discussed as well, albeit to a lesser degree (and see Milevski 2008). Technological and typological questions are treated summarily since at this stage of research there is not yet a complete picture on that.

At any case, several studies have recently advanced our knowledge of grinding stones, stone vessels, and their sources in the southern Levant. Especially those studies focusing on the EB Age have addressed both typological and sourcing questions, greatly increasing our overall understanding of exchange patterns for this period. In particular, basalt sources and archaeological artifacts derived from them have been studied in the last years by chemical methods, while minor studies have been devoted to sandstone tools.

Although technological and typological studies have appeared (Wright 1991, 1992; Hovers 1996; Rowan 1998) that deal with some aspects of production, we still have problems in defining different steps from the time they were quarried through their production and distribution. Sourcing studies have mainly been centered on basalt.[1]

Ethno-archaeological and historical studies present a number of examples for the quarrying, production and exchange of stone tools and vessels in ancient times and in pre-capitalistic societies. For instance, southern Mesopotamian documents from the 3rd millennium BC (Pettinato 1972:73–8) referred to trade of semi-precious stones (alabaster, lapis lazuli, carnelian, etc), and also alluded to finished groundstone tools.

Ethnographical data from Mesoamerica is provided by Cook (1968, 1970) quoted in the work by Torrence (1981:222–5), in the Oaxaca valley, Mexico. Rock outcrops from which *metates* are quarried are owned and access to them is restricted. Ownership varies from village to village. In some instances these quarries are privately owned and in others an entire community controlled them; usufruct is given to a group of persons or individuals (Cook 1970:795).

In other research Singer (1984) studied a quarry in the Chuckwalla Valley, Riverside Country, Colorado. Each tribal unit exploited different materials (felsites, basalt, quartz, chert). Some sites have been interpreted as centers for lithic extraction and reduction, acquisition and manufacture of cores, flakes, blades and assorted tools and blanks, with each center containing dozens of workshops (Singer 1984:39–40).[2]

Other studies on Egyptian modern alabaster production (e.g. Hester and Heizer 1981), show that the alabaster is quarried in large pieces and trimmed for transport to the workshop. Transportation and quarrying is done by the same workmen who switch tasks, working the stone and taking charge of loading the donkeys (Hester and Heizer 1981:37).[3]

One important, pioneering study on ground-stone tools in Mesoamerica (Rathje 1972) has stressed the subject of exchange, showing the existence of two types of commercial systems: (1) a 'market' system including households units, and (2) an 'extra market' network composed of itinerant merchants, merchants groups and stores. Exchange of *metates* (lower grinding stones) originated in the highlands and was carried out with the help of mules. The highlands' local exchange was easily accomplished because of the relative abundance of raw materials. In the lowlands political authority concentrated and dominated the exchange of commodities of the households. The pre-Columbian merchant of the lowlands was related to the ruling elite (Rathje 1972:371–2, 387–9). Buffer zones were involved in exchange between highland and lowlands. *Metates* were acquired in these buffer zones by a supra-household organization and then redistributed to households in the lowlands (Rathje 1972:Fig. 3).

2. Stone Tools and Materials

A. Basalt

Provenance studies

Basalt is a generic term for a hard, gray or black, grained, volcanic rock, made up of a variety of different minerals of which less than 52% silicon dioxide (SiO_2). Minerals commonly found in basalt include olivine, pyroxene, and plagioclase.[4] Archaeologists usually use the word 'basalt' to mean a dark, vesicular or non-vesicular igneous rock, a term acceptable for most archaeological purposes, but that can occasionally lead to descriptive

inaccuracies. For instance, several years ago when analyzing petrographic samples of basalt from Chalcolithic sites (Gilead and Goren 1989), it turned out that some of the bowls were made actually from phosphorite, a sedimentary rock containing phosphate, that outwardly looks similar to the basalt but when examined microscopically may be seen to be characterized by a profusion of organisms, mainly fish bones and molluscs (Goren 1991b). Since no known EB Age vessels are made of phosphorite we will not deal with this raw material.

A pioneering work on basalt from the Chalcolithic and the EB I periods was carried by Amiran and Porat (1984). Conducting petrographic analyses, they attempted to study the geological origin of raw materials from which the vessels were made. Two EB vessels from Bet Shean and Bab edh-Dhra were sampled, together with Chalcolithic samples. All the samples are of olivine basalt and it was concluded that all the material used for them must come from the Galilee, the Golan or Transjordan sources (Amiran and Porat 1984:14, 17). However, petrographic analysis could not distinguish between the basalts from these regions.

Recent provenance studies of basalt from the southern Levant have been able to differentiate between different sources of basalt. These studies are based on three different methods. The first one considered basalt artifacts from Natufian sites in western Galilee and was conducted by Weinstein-Evron and others (1995, 1999, 2001) based on K/Ar (potassium, argon) chemical analysis. This method is based on dating of basalt flows and can identify sources of basalt on the basis of known, datable flows. In the case of the Natufian sites the study points out that raw material was probably procured from outcrops 100 km distant from the sites, although there were closer, more easily accessible outcrops available in the Carmel area.

The present discussion, however, is based on a different study that relies on two alternate methods. One is X-Ray Fluorescence (XRF; Renfrew and Bahn 1994:316–17) utilized by Williams-Thorpe and Thorpe (Williams-Thorpe 1988; Williams-Thorpe and Thorpe 1993) and applied to EB stone objects from the southern Levant (Philip and Williams-Thorpe 1993, 2000, 2001). Using XRF, the weight of interpretation of the geochemical data is placed upon the stable elements which indicate rock tectonic settings and original magma. These elements are Titanium (Ti), Zirconium (Zi), Ytterbium (Y) and Niobium (Nb) (Williams-Thorpe and Thorpe 1993:280–1).

Rowan (1998:297–315) used Inductively Coupled Plasma-Atomic Emission Spectrometry method (ICP-AES; Renfrew and Bahn 1994:316). This method is utilized as a geochemical tracer of the rocks (Faure 1986:154–82). Geochemical reservoirs, distinguishing different rock types, are characterized by different Rb/Sr ratios, which are in general associated with K and Ca respectively. Rowan (1998: Tabs. 15–17) was able to determine 40 trace elements on the basalt outcrops samples and to source the basalt objects by determining precise frequencies of alkali metals Rubidium (Rb) and Strontium (Sr).

Archaeological and Geological Samples

Philip and Williams-Thorpe (1993:54; 2001:13, Table 1) studied 30 archaeological samples from basalt vessels and tools dated to EB I. These samples were compared with 21 geological samples from seven areas in Transjordan: Wadi Arab and Sal in the Yarmuk basin, Sweimeh and Ma'in northeast of the Dead Sea, the Mujib/Kerak plateau east of the Dead Sea and the Dana/Tafila area next to Wadi Feinan (Table 5.1, Figure 5.1:1). It appears the artifacts from Tel esh-Shuneh, Tel Erani, and Wadi Fidan 4 came from stratified contexts. Unfortunately, however, samples of vessels from Bab edh-Dhra, Ghor es-Safi[5] and Khirbet Hamra Ifdan (Wadi Feinan) are from fragments of vessels without stratigraphic contexts. However, it seems certain that they derive from EB I contexts (cf. Philip and Williams-Thorpe 1993:54–5). Confirmation of this comes from numerous good parallels.

Table 5.1 Distribution of basalt objects from EB I sites according to sources. Based on Philip and Williams Thorpe 1993, 2000, 2001; Rowan 1998.

Sources / *Sites*	*Tiberiah*	*W.Arab*	*Sal*	*Karameh*	*Sweimeh*	*Ma'in*	*Mujib/ Kerak*	*Dana/ Tafila*
Q. Ata		+						
Megadim							+	
T. esh-Shuneh		+						
Afridar							+?	
T. Erani		+?	+?					
S.T. Malhata							+	
B. edh-Dhra					+	+	+	
Safi							+	
W. Feinan							+	+

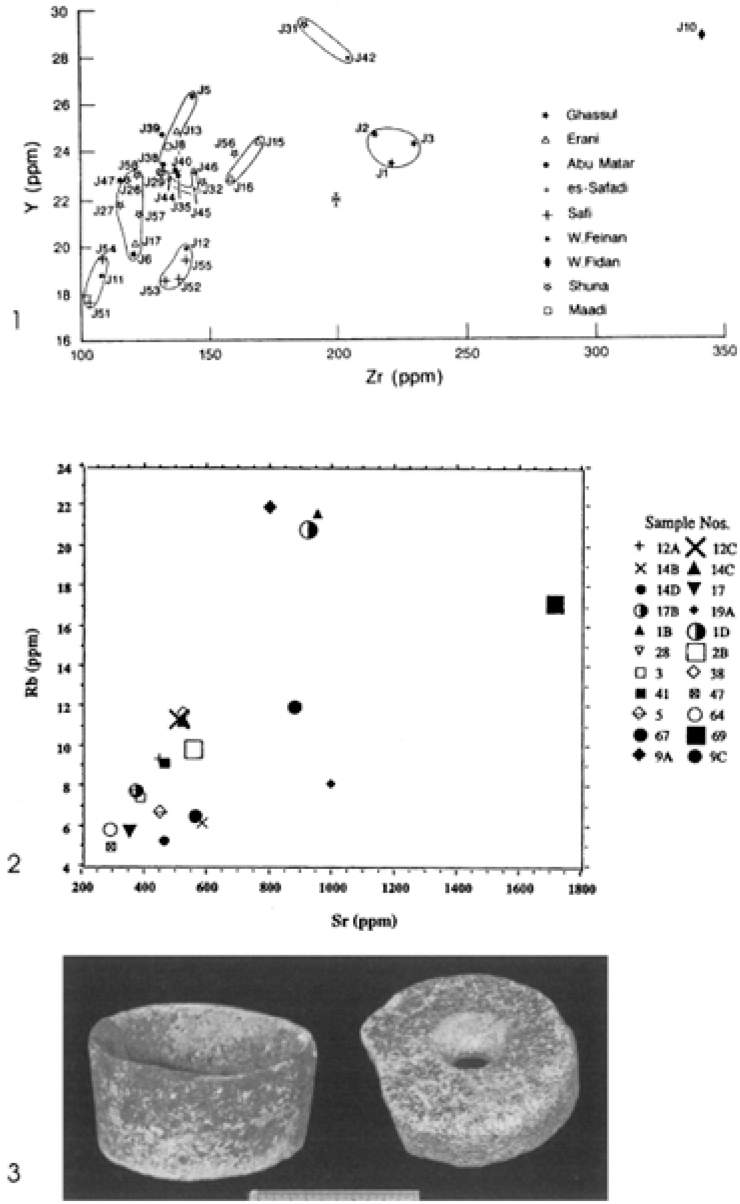


Figure 5.1 Basalt samples and objects. 1. Graph of Y (ppm) against Zr (ppm) (after Philip and Williams-Thorpe 2001: Fig. 2). EB I samples: Erani, Safi, W. Feinan (Khirbet Hamra Ifdan), W. Fidan (W. Fidan 4), T. Esh-Shuneh. 2. Graph of Rb (ppm) against Sr (ppm) (after Rowan 1998: Fig.67). EB I samples: 17. S.T. Malhata; 28. Q. Ata; 38. Afridar, Area E. 64. T. Megadim. Sources: 1B-D.Sweimeh; 2A-B. Ma in. 9A-C. Tafila. 12AC. Mujib. 13A, 14B-D. Kerak. 16B, 17B. Yarmuk area. 19A. Dana. 3. Basalt bowl and bowl recycled as potter's wheel from H. Ptora (courtesy of Y. Baumgarten, IAA).

Some of the vessels seem to belong to simple bowls with flaring rims and high base defined by Braun (1990) as Type IB and by Rowan (1998) as Type 3C (e.g. Figure 5.1:3). One example from Ghor es-Safi (Philip and Williams-Thorpe 1993 :Pl.2) shows a known type with a decoration of two parallel ribbed lines.

The closest parallels were found in EB I contexts at Gezer (Seger 1988: Fig.5:1) and Lod (Milevski, in press a). Bowls with similar decorations are known from Hartuv (Mazar and de Miroschedji 1996:24) and Bab edh-Dhra (Schaub and Rast 1989:Figs. 168: 4, 6, 1 and 169 : 4, 11, 12) (and see Braun 1996b: Fig.VC.5.c). One from Safi (Philip and Williams-Thorpe 1993:Pl.1) seems to belong to a four handled bowl, Braun's (1990) Type IB and Rowan's (1998) Type 3Civ.

Rowan's (1998:Tables 15–17) samples included four basalt bowls dated to EB I[6] and 19 samples from basalt outcrops (cf. Table 5.1, Figure 5.1:2). The archaeological samples were collected from Qiryat Ata, Tel Megadim, Small Tel Malhata and Afridar (Area E) and are from flaring rims of bowls (Braun's [1990] Type IB; Rowan's [1998] Type 3C) and one mace-head (Rowan 2004:Fig. 2:1). Flow samples were taken from most of the same outcrops (Philip and Williams-Thorpe 1993), namely the Yarmuk basin, Sweimeh, Ma'in, Mujib, the Kerak plateau and Dana.

Results

The results of the investigation by Philip and Williams-Thorpe (2000, 2001) of the samples from Tell esh-Shuneh indicate the vessels are compatible with sources in the Wadi Arab and nearby Sal. Samples from Tel Erani are not compatible with known geological samples, but they could be from a northern origin. The Bab edh-Dhra, Safi and Wadi Feinan samples are distinguished by their low levels of Y, indicating an origin in the Sweimeh, Ma'in and Mujib/ Kerak sources. Zr and Nb appear also in similar rates as in the geological samples (Philip and Williams-Thorpe (2001:1382–84).

The sample from Qiryat Ata looks similar to a sample from the region of Umm Qeis (the Wadi Arab area), while the Tel Megadim and Small Tel Malhata samples are compatible with the middle of the Yarmuk and Kerak flow samples (Rowan 1998: Figure 67). A sample from Afridar matches outcrops of the Mujib/Kerak plateau.

Discussion

According to results obtained from the small but important database of chemically analyzed samples, it is possible to suggest provisional conclusions on exchange of basalt artifacts during EB I (see Figure 5.2). Basalt artifacts at most sites seem to have originated at sources close by, as in the cases of Tel esh-Shuneh, Bab edh-Dhra, Ghor es-Safi and the Wadi Feinan sites. West of the Jordan River the sites are up to 100 km distant from the sources as the case of Afridar. Objects from Tel Megadim and Small Tel Malhata are problematic because their chemical profiles match no particular source, but appear to be similar to something between basalt flows of the Yarmuk basin and the Kerak plateau. The origin of the sample from Erani has also not been satisfactorily

resolved, although a northern origin is possible.

Additional information on basalt flows in the region would be helpful in determining the ultimate provenance of artifacts. For instance, information on basalt from outcrops near Tiberias could prove valuable for understanding sources, especially since we know that during the Late Bronze and Iron Ages, basalt artifacts from this source made their way to Tel Miqne (Williams-Thorpe, in press).

According to available data it seems that restricted circuits of basalt production and distribution existed, some in the north and some in the eastern Jordanian plateau. Philip and Williams-Thorpe (2000:19) have suggested that there were different procurement systems for tools and vessels, but it seems to be too early to make such statements on the basis of the data presently available. In the southern part of the southern Levant in the EB Age, the exchange of basalt artifacts seems also to be related to distribution of metal artifacts, since one of the basalt sources is near the Wadi Feinan deposits of metal ores.

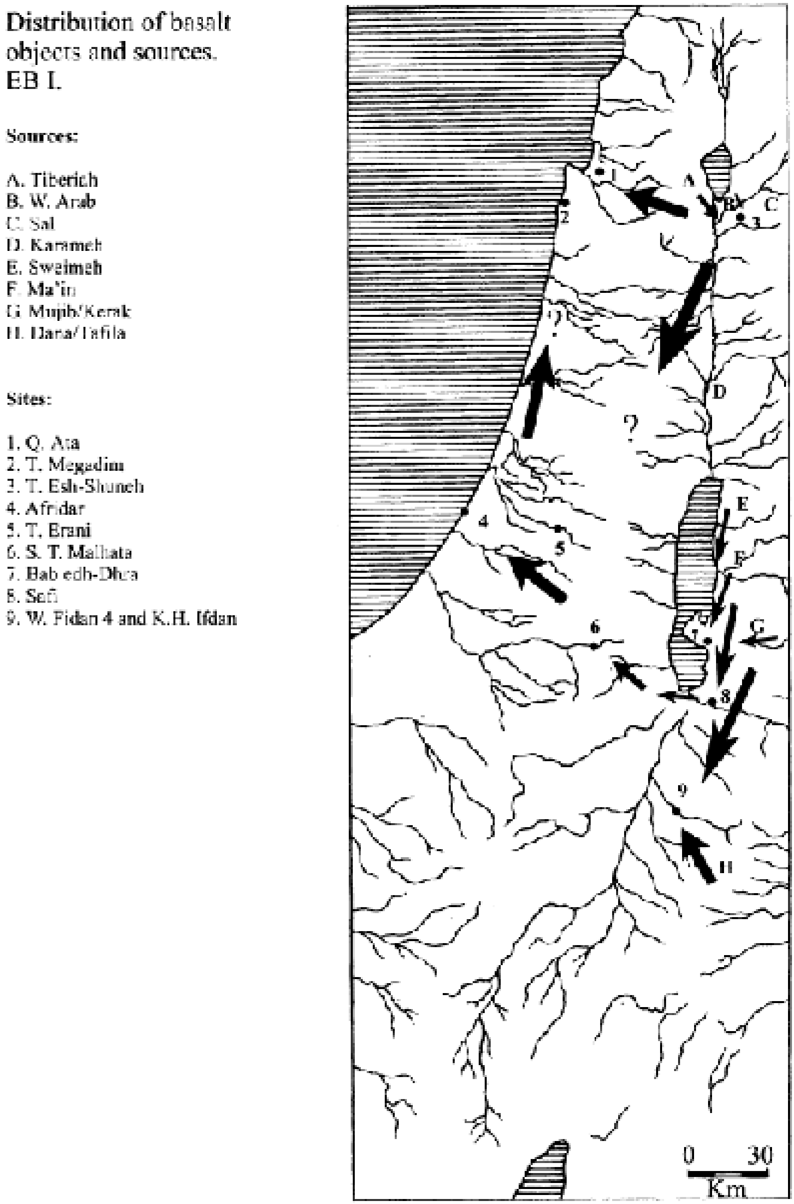


Figure 5.2 Distribution of basalt objecst and sources, EB I.

Unfortunately, no remains of quarries or workshops of basalt vessels or even grinding stones have been found to date. We suggest that the production of basalt artifacts took place near the sources of raw material, and that their exchange must have been controlled by communities settled nearby, as practiced by inhabitants of the Oaxaca Valley or Chiapas in the ethnographic examples described above. The relatively long-distance distribution network for these heavy objects suggests that their exchange was controlled, at least in the first link of the network, by the producers. Basalt tools originating east of the

Dead Sea and in the Wadi Feinan could have been distributed by merchants engaged in metal exchange with centrally located or important settlements such as Arad. *Wadis* and valleys leading to the Mediterranean coast could have been the routes by which ground-stones arrived at sites such as Small Tel Malhata, Afridar and Qiryat Ata.

B. Sandstone

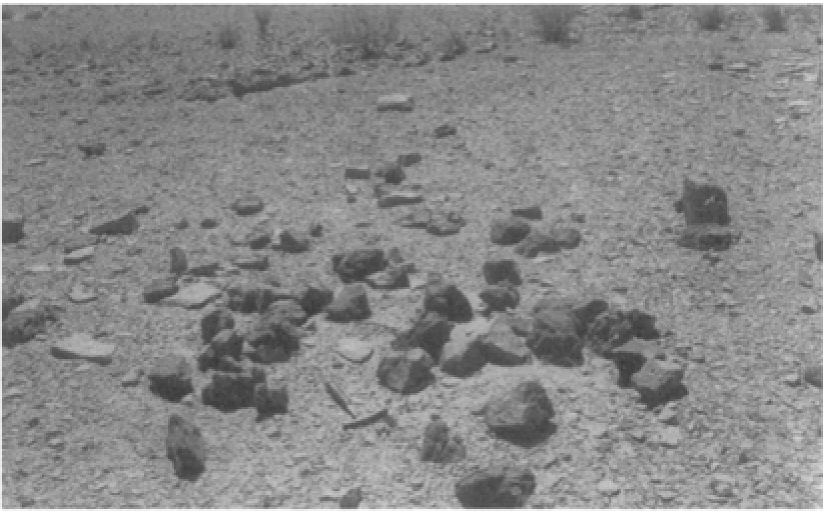
Ferruginous quartzite sandstone originating in the area of the Ramon Crater in the Negev has been the object of several recent studies (Rosen and Schneider 2001) (Table 12). This sandstone belongs to the Upper Inmar formation datable to the Lower, Middle Jurassic (Zak 1968). In spite of the fact that these studies present preliminary conclusions we consider that some working hypothesis may be drawn from the data (Rosen and Schneider 2001:208). Abadi (2003) has investigated mining, production and distribution of grinding stones made of this material during the EB Age.

A survey of two sites in the Ramon Crater, Ramat Saharonim and Nahal Ramon 204/160, resulted in their identification as quarries datable to the EB Age.[7] The Nahal Ramon site, located through survey work in the west center of a Ramon Crater survey (Rosen 1994) near the excavated Camel Site (Rosen 1997c, 2003b), was only recently identified as a quarry (Rosen and Schneider 2001:204).

Quarries, Settlements and Sandstone Objects

Ramat Saharonim North (Figure 5.3:1) is a quarry located in the eastern part of the Ramon Crater, ca. 1 km from a bend in the Nahal Ramon (Figure 5.4) and 100–200 m north of a sanctuary site known as Ramat Saharonim (Cohen 1999:21–5). There are at least 10 concentrations of blocks of quartzite sandstone showing quarrying activities (Rosen and Schneider 2001: Figs. 2–3) at the site. Large flakes are characteristics of the waste, chunks are lesser and chips are few (Abadi 2003:39–45).

The site of Nahal Ramon 204/160 (Figures 5.3:2, 5.4) is located on a low old and eroding floodplain next to Nahal Ramon in the west center of the Ramon Crater (Rosen 1994:85) where exposures of sandstone consist of a broad stratum on the top of the hill with high frequencies of iron oxide. There are considerable quantities of debris and large blocks. Piles of this debris contain crude rough-outs with flaking scars and large flakes (Rosen and Schneider 2001:Figs. 5–6; Figure 14:2).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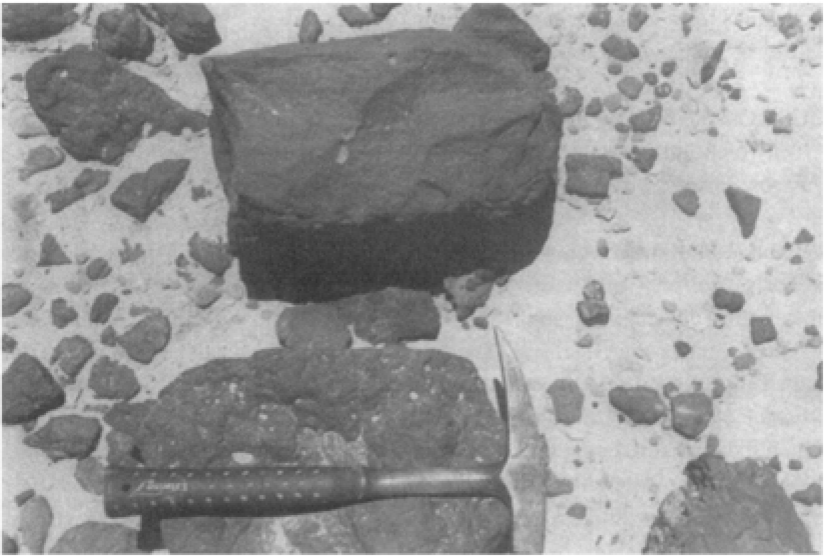
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Figure 5.3 Ferruginous sandstone blocks and rough-out. 1. Concentration of sandstone blocks from Ramat Saharonim (N) (after Rosen and Schneider 2001: Fig.2). 2. A sandstone rough-out from Nahal Ramon 204/160 (after Rosen and Schneider 2001: Fig.6).

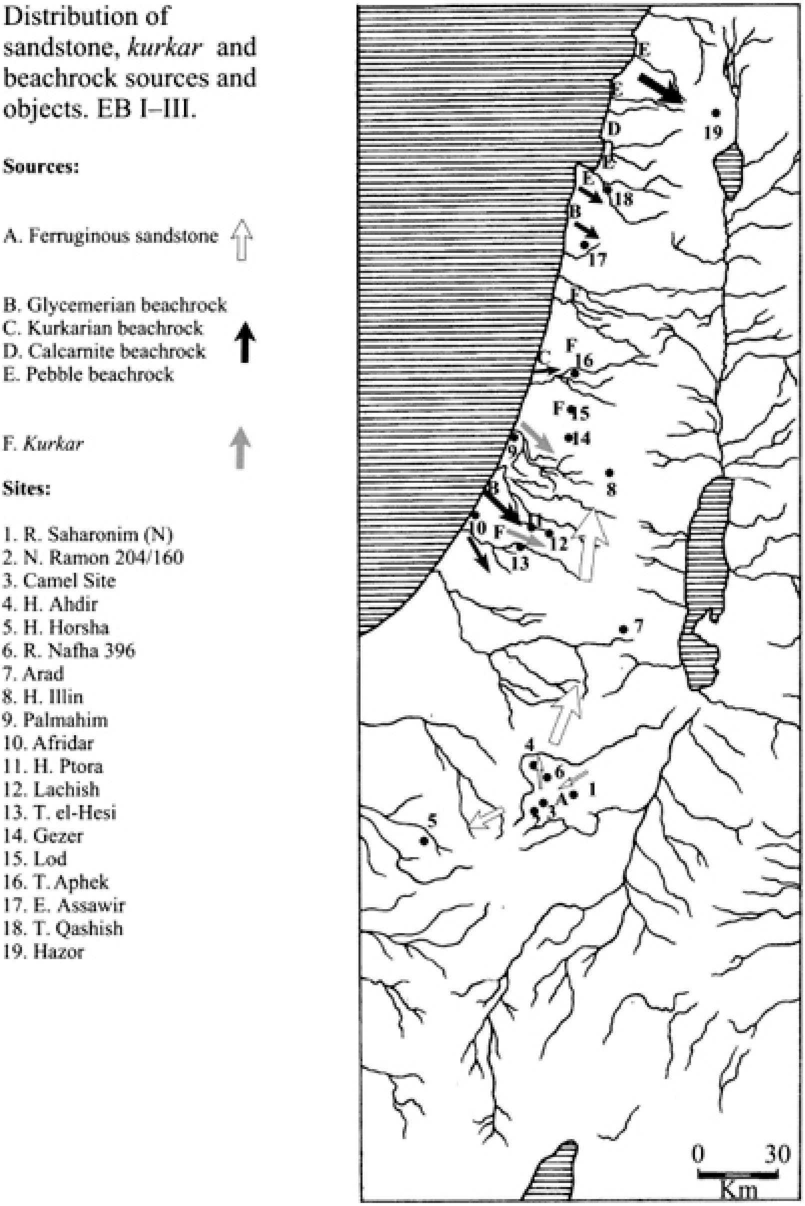


Figure 5.4 Distribution map of sandstone, kurkar and beachrock sources and objects, EB I–III.

At the Camel Site on the north cliff of the Ramon Crater, some 8 km northeast of Nahal Ramon 204/160, grinding stones, including lower and upper grinding stones, flakes, chips and chunks made of sandstone and production waste, were found (see Table 5.2).

Table 5.2 Distribution of beach-rock, kurkar and ferruginous sandstone artifacts.

Raw material / Sandstone / Kurkar	
Sites	

Hazor (EB II–III?)	+
T. Qashish (EB I–III?)	+
E. Assawir (EB IA)	+
T. Aphek (EB II)	+
Lod (EB I–II)	+
Palmahim (EB I),	+
Gezer (EB I?)	+
H. Illin (EB IB)	+ ?
Lachish (EB I?)	+
H. Ptora (EB I)	+
T. el-Hesi (EB III)	+
Arad (EB II)	+
Afridar (EB IA)	+
Rekhes Nafha 396 (EB II)	
Camel Site (EB II)	+
H. Ahdir (EB II)	+
N. Ramon 204/160 (EB II?)	+
R. Saharonim (N) (EB II?)	+
H. Horsha (EB II)	+

Petrographic analysis was done on 14 samples taken from Ramat Saharonim and Nahal Ramon quarries and the Camel site (Rosen and Schneider 2001:Table 1). The samples from the Nahal Ramon quarry are different from those of Ramat Saharonim; while the last ones show metamorphoses, the samples from Nahal Ramon are othoquartzite and do not show metamorphic deformations. Several of the flakes and chunks of the Carmel Site are quite similar to those of Nahal Ramon 204/160. One chunk is metamorphic as the case of Ramat Saharonim.

Several ground-stone tools from Rekhes Nafha 396 (Saidel 2002:51, Fig. 14:11) located some 12 km north of the Camel Site, including seven grinding stones, three of sandstone, were found. No petrographic analyses for them are published and so no further comment on them is possible. According to Abadi (2003:33–8) debitage indicates that a small workshop for stone tools existed at the site.

Several (lower?) grinding stones made of sandstone were found at EB II sites of the Central Negev including Horvat Ahdir (Cohen 1999:56, 70, Photo 23). At another, Har Horsha, it appears (according to descriptions of Haiman 1991:10*, Table 2) that ferruginous sandstone tools were found. Several groundstones, also of ferruginous sandstone, are reported from EB II Arad (Amiran, Ilan and Sebbane 1997:55, 88). It is likely that the ferruginous sandstone of the Ramon Crater quarries is the source of all those tools.

Further north, in the Shephelah, stones made of sandstone were found at the EB I site of Lower Horvat Illin (Milevski, in press b). Unfortunately, no

petrographic analysis could be carried out to confirm the source of these samples.

Discussion

Analysis of the sandstone quarries cited above, waste assemblages and the distribution of ferruginous sand stone tools suggest some provisional conclusions (see Table 5.2, Figure 5.4) concerning exchange of groundstone objects in the EB Age. The Ramon Crater could be a source as well as a location of workshops for some of these objects. Thus, it would have been an integral part of the distribution network of this commodity during the EB Age. There are at least two quarries in the Ramon Crater, some 20 km next to each other, and debris containing rough-outs with flaking scars and large flakes from Nahal Ramon point out to a primary workshop at one of them.

At Ramat Saharonim a small quantity of chips shows that primary modification occurred there to some small degree. The Camel Site and probably Rekhes Nafha were probably secondary workshops for manufacture of grinding stones. Presumably inhabitants at these locales were the owners of the quarries, as in the example of Mesoamerica, with some villages controlling the access to the sources (e.g. the Oaxaca and Chiapas regions).

From these sites the tools, whether in a finished form or as blanks, could have been distributed to Arad and other points in the Negev and beyond, even farther to the north. Exchange of sandstone artifacts could have been combined with exchange related to pottery wares from the Negev, as the pottery Fossil Shells Group originated in the Southern Negev indicates (and see above). It is not clear whether or not producers of the tools were also the traders of commodities or alternatively other merchants were involved in the Negev network exchange.

C. Beach-Rock and Kurkar

Raw material

Although limestone and basalt represent the bulk of raw material use for fashioning groundstone tools and vessels in the EB, some grinding stones found in EB contexts were made of beach-rock and *kurkar.* Beach-rock is a sedimentary rock found on the Mediterranean coastline, produced by a conglomeration of sand, shells, pebbles and *kurkar* (and see below) with the help of calcium carbonate ($CaCO_3$) (Mazor 1980:132; Mitchell 1985:28).

Neri's (1994) study of grinding stones made of beach-rock from several periods includes the geology of the rocks and mechanic laboratory tests that measure the strength and abrasion values of tools. Four types of beach-rock (designated according to binding material) relevant to this study are: (1) Glycemerian, includes *Glycemeris sp.* shells, quartz and few kurkar fragments bind with aragonite (Neri 1994:72, Fig. 23), appears mainly in the southern

shores of Bat-Yam and in the area of Dor; (2) Kurkarian (mainly kurkar and sand nodules bind with high Mg calcite; Neri 1994:72, Fig. 24), appears in the shores between Jaffa and Caesarea; (3) Calcarnite Nahariya (sand, pebbles and few shells with high Mg calcite; Neri 1994:72, Fig. 23), on the shores between Rosh Haniqra and Atlit; (4) Pebble beach-rock (mainly pebbles bind low Mg calcite) (Neri 1994:75), appears in the estuaries of the *wadis* along the coastal shores between the western Galilee and the Carmel ridge.

Kurkar is a geological formation unique to the southern Levantine coast and is a Pleistocene formation of hardened mobile sands (i.e. fossilized dunes). It forms a ridge or several ridges with some outcrops of *hamra*, a formation also common to the coast (Gvirtzman *et al.* 1984, 1998) and roughly parallel to it. *Kurkar* and *hamra* bases are unevenly covered with a sand layer that can become relatively deep. Where strong sea winds prevail, this layer becomes thinner or disappears, leaving *kurkar* and *hamra* bases exposed.

Distribution

Data for beach-rock and *kurkar* stone tools found in archaeological excavation are presented in Figure 5.4 and Table 5.2 and was discussed elsewhere (Milevski 2008). The northernmost known appearances of beach-rock tools are the Galilee, the Jezreel and the Huleh Valleys. Other regions are the northern Sharon Plain, the Central and Southern Coastal Plain, and the southern Shephelah.

Beach-rock and *kurkar* objects dispersed so widely show that a small scale exchange network existed along the Mediterranean Littoral. Probably this was also part of the exchange with this area, as attested by Mediterranean shells found at several sites in the Shephelah.

Discussion

Exchange of beach-rock and *kurkar* groundstone objects seems to be restricted to the area along the Mediterranean littoral in the central and southern regions and in the Shephelah. Distribution of beach-rock and *kurkar* tools is confined to an area of a maximum 35 km from the shores (e.g. Hazor or Lachish). The routes by which beach-rock and *kurkar* objects were dispersed over a trading network are difficult to reconstruct at present. However, it seems that a primary network extended from the shores of the Mediterranean Sea through the Sharon plain, the Ayalon Valley and the Shephelah, and through some *wadis* as far north and east as Hazor in the Huleh Valley.

Beach-rock and *kurkar* could be obtained directly by groups of people from sites at some distance from the sources, traveling to the coast where they would quarry pre-forms or small blocks, as in the case of the quarries of the Chuckwalla Valley in Riverside Country, Colorado. Probably this would involve a maximum journey of two days for the south Levantines. Alternatively, it is

suggested that those involved in the quarrying and fabrication of the beach-rock tools were local inhabitants (e.g. Palmahim Quarry, the Afridar cluster of sites) that owned the quarries—as in the case of the Oaxaca villages in Mexico.

3. General Discussion

From the above-presented data, all the local exchange of ground-stone tools during the EB Age in the southern Levant seems to show a similar pattern. The main characteristics of this exchange are a localized net of distribution, a non-homogeneous market and the consequent non-integration of economic forces in the territory within the scope of this study. Each raw material type has a different network of distribution and probably a different mode of acquisition or procurement.

The domestication of the donkey during the EB Age seems to imply a sort of technical innovation in the transport methods *vis-à-vis* previous late prehistoric periods (cf. Chapter 10). As these beasts of burden were capable of carrying dozens of kilograms over several kilometers for repeated journeys, transport of pre-forms and final stone tools and vessels became easier than it had formerly been (and see below). However, it is worth noting that the manufacture and distribution of basalt vessels was well developed prior to the EB (Amiran and Porat 1984; Gilead and Goren 1989; Epstein 1998:229–67; Rowan 1998). Furthermore, beach-rock tools also existed during the Neolithic and the Chalcolithic at Nahal Oren, Kabri, Palmahim, Gilat and Shiqmim (Neri 1994:Table 2).

The example of Mesoamerican '*cargadores*' (transporters of cargo) of the pre-conquest period (Rathje 1972:371) indicates that workmen on their own could only carry about 45 kg, a weight equivalent to two lower and four upper grinding stones. With the domestication of donkeys (see Chapter 10), this load could be enlarged. For instance, the standard weight carried by a donkey in Assyrian caravans to Capadocia was *ca.* 75 kg (Larsen 1967:141–55).

It seems that for basalt and the ferruginous sandstone, those involved in the quarrying and fabrication of tools and vessels were inhabitants of villages near quarries as in the ethnographic examples show above (Cook 1968, 1970; Hester and Heizer 1981, Singer 1984). Such settlements probably owned or controlled the quarries and took advantage from exchange with other near-by and faraway peoples. Alternatively it can be suggested that intermediary, itinerant merchants or even the manufactures themselves, managed the network of exchange, as in the case of highland/lowland exchange in Mesoamerica (Rathje 1972).

Part of the network of ground-stone exchange appears to suggest some degree of integration with dispersal networks for other commodities. This is the case of basalt objects originating in the Dana/Tafila region, near Wadi Feinan. Objects deriving from the Northern Negev and the Southern Coastal Plain could

be distributed together with metal that originated in the Feinan area. Ferruginous sandstone tools seem to have been distributed through the same network of distribution as some pottery vessels originating in the Negev, that were eventually deposited at Arad and more northerly locales. Similarly restricted circuits of distribution of basalt items also existed in the north. The best samples originated in the Yarmuk region. Still other ground-stone artifacts may well have originated in outcrops near Tiberias.

Sites located at buffer or intermediate zones (i.e. those regions between quarries and producers on the one hand and end-consumers on the other) such as Arad, participated and probably benefited from exchange of ground-stone implements and other commodities passing through them.

Unfortunately, due to the small amount of data available for each phase of the EB, we are unable to understand the nuances of chronological development of the ground-stone exchange through time, from EB I through EB III. Too little is known about the particular differences of each period. It should be noted that the basalt samples are all dated to the EB I, as are most of the beach-rock examples. More sampled data, hopefully in a near future, will allow a better understanding of this aspect of localized exchange.

Notes

1. The EB ground stone industry includes artifacts produced by a variety of techniques. The most common means used were pecking, grinding, abrading and polishing (Clark 1988:83). Wright (1992:53) also includes techniques such as flaking, drilling and incising, while Adams (1998:2), in defining grinding technology, outlines three different categories of artifacts employed in grinding: (a) those used to reduce substances, (b) those used to shape other artifacts, and (c) those shaped by ground stones (but see Wilkie and Quintero 1996).

2. Examples of quarrying and production of grinding stone tools are provided as well for the lower Colorado River in Arizona from ethno-historic data from Spanish and American sources, showing that the people from the Yuma, Kamia and Qechan tribes went to this quarry for centuries to get ‘grinding stones’ (Schneider 1996).

3. For other cases of raw material procurement see Abadi 2003:3–4.

4. The *Oxford Companion to the Earth* states that: ‘“Basalt” is a term widely used and abused. It has been employed both as a specific rock name … and as a general term for almost any dark, fine-grained igneous rock … Not all rocks of basaltic composition are, however, dark and fine-grained, nor are all dark, fine-grained, igneous rocks of basaltic composition. While the term ‘basalt’ remains a useful field name, it should be borne in mind that whole books have been written on the finer details of the sub-classification of rocks of basaltic composition’ (Hancock 2000:64). I am indebted to Graham Rutter, University of Durham, for this reference.

5. Cf. Politis 1998.

6. Other samples were derived from Chalcolithic contexts.

7. And see above discussion on the dating of EB sites in the Negev in the section dedicated to the pottery groups of the Negev.

6

Metallurgy and Metal Objects

1. Sources, Production and Exchange

Metal tools and objects revealing metallurgical operations, mainly from copper, were found at several EB sites, mostly in EB I and EB II strata (see below Table 6.1 and Figure 6.3). Metal artifacts of silver and gold have also been found in EB deposits (Mazar, Amiran and Haas 1973; Prag 1978; Amiran 1983; Shalev 1992:Table 3-A3; Philip and Rehren 1996), but they are so rare that they offer no data relevant to the subject under discussion. Consequently, only copper objects are dealt with in the following discussion.

The division of the copper objects proposed here is into tools, weapons and other miscellaneous objects and remains of metallurgical activity; this is a simplified version of a classification proposed by Shalev (1992:Table 3-A.1). We will present the evidence for the most frequently encountered copper tools and weapons found at EB sites according to the definition given by the excavators. The only specific typology is that developed by Miron (1992) for bifacial blades, i.e. axes, adzes and chisels in a search for some pattern of distribution.

A. Ethnographic Background

Before we deal with the archaeological data from the EB Age, we also consider necessary to address questions related to the production and exchange of metal objects, as understood from ethnographic studies. These observations are based mainly on the work of Rowlands (1971).

Ethnographic examples assembled by Rowlands (1971:211) show that while relatively long-distance exchange occurs with smiths who are near the metal

sources, other cases point out that metal workers only contribute with their skill, while the raw material is provided by the customers, sometimes together with fuel and/or labor.

Rowlands (*idem*, 213) also discusses the commonly accepted idea that metalsmiths are professional specialists isolated from other social groups, doing a full time job within the society they lived (cf. Childe 1930; Renfrew 1969:160). Metalworkers are not always a specialized caste, within tribal boundaries (and see Brouwer 1995; Levy *et al.* 2008), there are cases in which smiths are itinerant craftsmen of diverse origins: e.g. the Solubba of the Arabian Peninsula (Betts 1989) or the Kenites, Midianites and Rechabites of the Bible (McNutt 1994). In other cases, smiths are itinerants but each also has a fixed workshop in one of the villages.

Corporate groups of smiths may act in particular settlements and develop and extend exchange networks that supply metalwork to surrounding settlements. Sometimes smiths went to neighboring settlements and sometimes customers brought the smith to their own workshop. In both cases, distance between settlements traveled by smiths is limited (Rowlands 1971:214).

In some instances we find examples of commodities exchanged for metalwork; see for example, Nandi men of Kenya who acquire tools and weapons in exchange from the Doruba for honey and small baskets. Others such as the Basakata smiths of Congo 'pay' with metals in exchange for salt and luxury items from neighboring peoples (*idem*, 219).

From historical sources of the 3rd millennium BC from southern Mesopotamia and Ebla we learn that exchange of metals and metal objects in cities was controlled in most cases by the authorities (Pettinato 1972:79–83; 1979: 177). In Ugarit we note that during the 14–13th century BC, copper was brought from outside the region, although there were many copper smiths in the city (Heltzer 1977:205). Copper was brought to the city by merchants leading caravans of donkeys (and see below) under the auspices of the authorities (*idem*, 206). In biblical sources (1 Chr. 4:14, Neh. 11:35) it appears that some of the craftsmen were located in the so-called Valley of the Craftsmen, indicating that metalsmiths or other craftsmen habited in particular regions of the country (cf. Har-El 1977).

B. Archaeological Sources and Technology

While sources and some of the workshops for stages in copper production seem to show a continuation from the Chalcolithic period (Shalev and Braun 1997; Segal, Halicz and Kamenski 1997, 2003), EB metal production indicates a change in methods, the level of craft specialization, and in the function of copper objects (Rosen 1996c). According to Shalev (1994, 1995), this change may be recognized by the unity of the repertoire of objects and the use of the same source-metal for a wide range of products. A separation between extraction and production in technological and geographical terms is also a

characteristic of the period (Shalev 1994) as well as a relative standardization in copper production from EB I to EB II–III (Golden 2002:226).

The three sources for copper ores relevant for our research are those from Southern Sinai, Timna in the western Aravah, and Feinan in the eastern Aravah. Rothenberg researched dozens of ancient sites in the western Aravah, searching for evidence of copper production. Some of them have been suggested to be dated from the Chalcolithic period (Rothenberg, Tylecote and Boydell 1978; Rothenberg and Glass 1992; Merkel and Rothenberg 1999). However no clear proof has been presented for this date or an EB date (cf. Ilan and Sebbane 1989; Hauptman, Begemann, and Schmitt-Strecker 1999; Genz 2001).

Analyses of the chemical composition of copper objects have been compared with copper ores from the three sources mentioned above. In the past, Sinai has been suggested as the source of the Canaanean copper objects (Amiran, Beit-Arieh and Glass 1973; Ilan and Sebbane 1989). However, lead isotope and trace elements contents for copper artifacts from EB I and II strata at Arad show that they could have derived from either Feinan or Timna (Hauptmann, Begemann, and Schmitt-Strecker 1999).

The results of chemical analyses on copper objects from Afridar (Areas E and G) also seem to point to Timna or Feinan as probable sources of the metal (Segal, Halicz and Kamenski 1997, 2003). However, the chemical composition of the slags from Afridar points to the Feinan region as their source; isotope ratios of the slags correspond to Feinan ores and slags (idem). Ore fragments from Tel Halif (Nahal Tilla) also show similarities with the Feinan ores (Golden 2002:227; cf. below).

The evidence for copper industry in EB sites of the southern Levant is presented in the following lines (see Figure 6.3 and Table 6.1 with bibliography).

Early Bronze I

Evidence for an EB IA copper industry at Feinan was unearthed in excavations at Wadi Fidan 4, where crucibles and furnaces were found.[2] They are located near the sources of copper.

One of the most important centers of metallurgical activities is Area E at Afridar on the Southern Coastal Plain. Hemispherical crucibles (Figure 6.1:1), slags, prills and copper tools were found there. In addition, several burnt structures found near the crucibles could be interpreted as simple furnaces similar to those found in the Feinan region. Dozens of pits were uncovered near the crucibles and brick installations, while the area yielded a large quantity of copper objects. In Area J, a fragment of an ingot (Figure 6.1:2) was found together with other metallurgical remains. Recently, a site dated also to the EB I was found in the Ashkelon neighborhood of Barnea, a few kilometers north of Afridar. It also yielded remains of metallurgical activities (A. Golani, pers.

comm.).

Other sites yielded minor evidence of metallurgical activity in the EB Age. They are discussed below, in a progression from north to south. A single crucible was found in an early EB I context at Yiftahel II. Metzer (EB IA) apparently yielded another crucible. At Tel esh-Shuneh archaeo-metallurgical remains were also found in EB I contexts. They include ingots, remains of molds used for casting ingots and crucible fragments (Figure 6.1:3).

At Lod (Neve Yeraq) two crucibles were found in a late EB I context. Additional excavations on the tell yielded slag and prills in late EB I–II contexts.

Crucibles from EB I contexts at Tel Erani were found. Slag and prills were found also at the nearby site of Horvat Ptora.[3] Crucibles were found at Lachish in the NW settlement.

The EB I occupant at Site H on the Wadi Ghazzeh (i.e. Nahal Habesor) yielded large quantities of copper ore and slag, very likely originated at Feinan.

Excavations at the Halif Terrace have also yielded metallurgical remains, crucibles and copper fragments, in a context defined as a small workshop dated to EB I. Excavations at Small Tel Malhata produced some crucibles from EB I contexts. Tel Maqass, near the Gulf of Aqaba, has yielded slag and prills, as well as several crucibles (Khalil 1992; Khalil and Riederer 1998; Genz 2001: 59–60). The site must be dated to the early EB I, according to parallels provided from Wadi Fidan 4.

Early Bronze II

Metallurgical activity at Feinan is known from EB II from excavations at Barqa el-Hatiyeh. An impressive increase in copper production at Feinan from EB I to EB II existed due to a much more advanced technology than that used in the Chalcolithic period. In the same region, changes were discerned from the EB I to EB II, where the evidence of Barqa el-Hatiyeh shows a developed technology in smelting ovens. Evidence of more intensive mining activities in EB II was also found in shafts and galleries with high grade ore in much more plentiful quantities. Earlier, EB I mines, were located in the Massive Brown sandstone.

Copper production of Feinan in EB II is reflected at Arad (Strata III) where crucibles fragments were found (Figure 6.1:4).

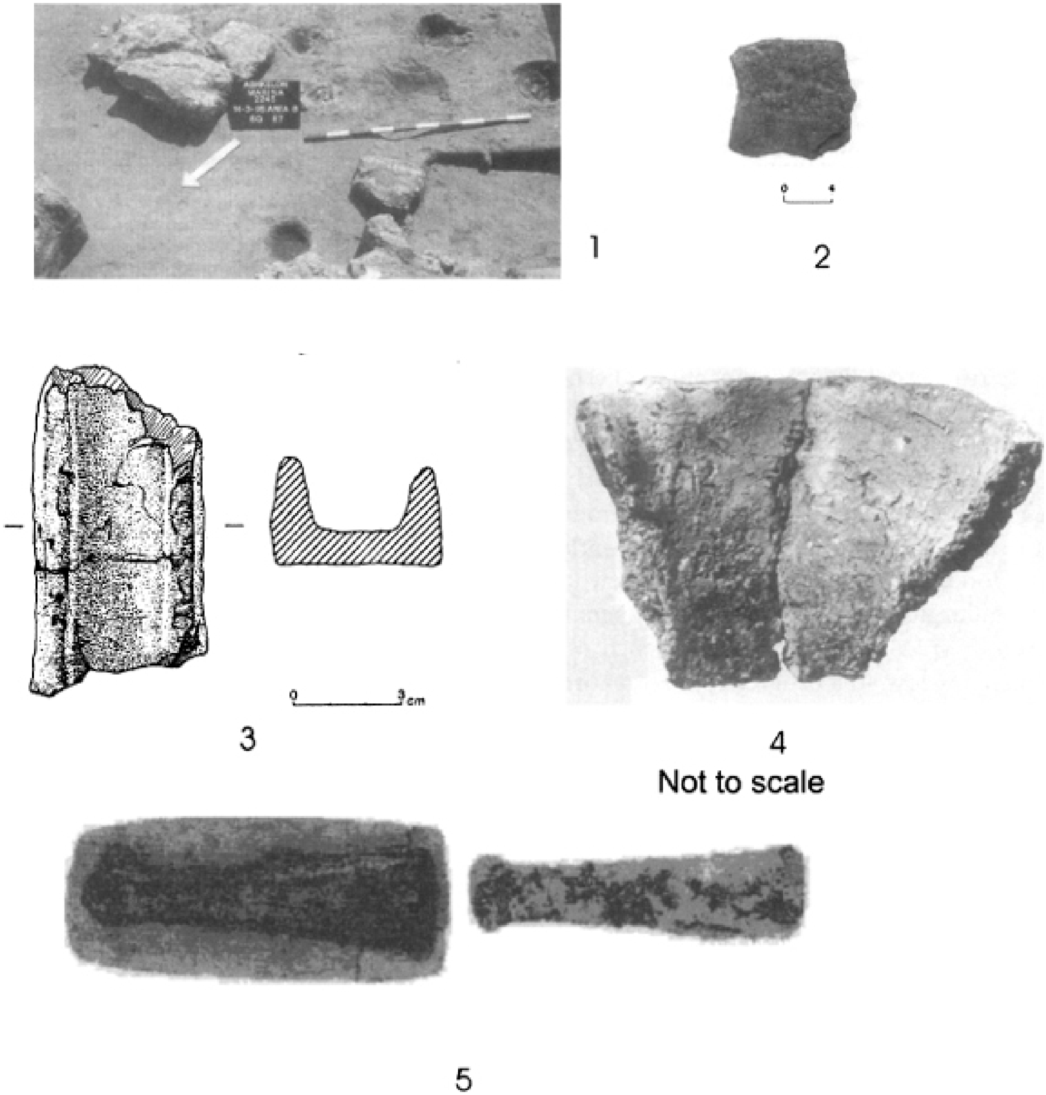


Figure 6.1 Metallurgy remains. 1. Smelting installations, Afridar Area E (after Golani 2004:Fig. 20). 2. Ingot, Afridar Area J (after Baumgarten 2004: Fig. 19.2). 3.Crucible/mold, T. es-Shuneh (after Rehren, Hess and Philip 1997: Fig. 2). 4. Crucible, Arad (after Amiran *et al.* 1978:Pl. 121:9, courtesy of the Israel Exploration Society). 5. Mold and axe, K. Hamra Ifdan (after Levy *et al.* 2003: Fig. 3:6–7).

Two additional sites appear to have yielded evidence of metalworking; Lod in the Central Coast Plain and the Camel site in the Negev mountains, which also appears to date to EB II.

Early Bronze III

During EB III metallurgical activity continued to take place at Feinan, probably towards the end of the period, as is evident from Khirbet Hamra Ifdan, where hundreds of molds and crucibles were found (Figure 6.1:5). At Numeira, near

Bab edh-Dhra in the eastern plain of the Dead Sea, remains of melting and casting activities. The only indications in the north came from Megiddo where a mould for an axe was found in an EB III (Stage II) context.

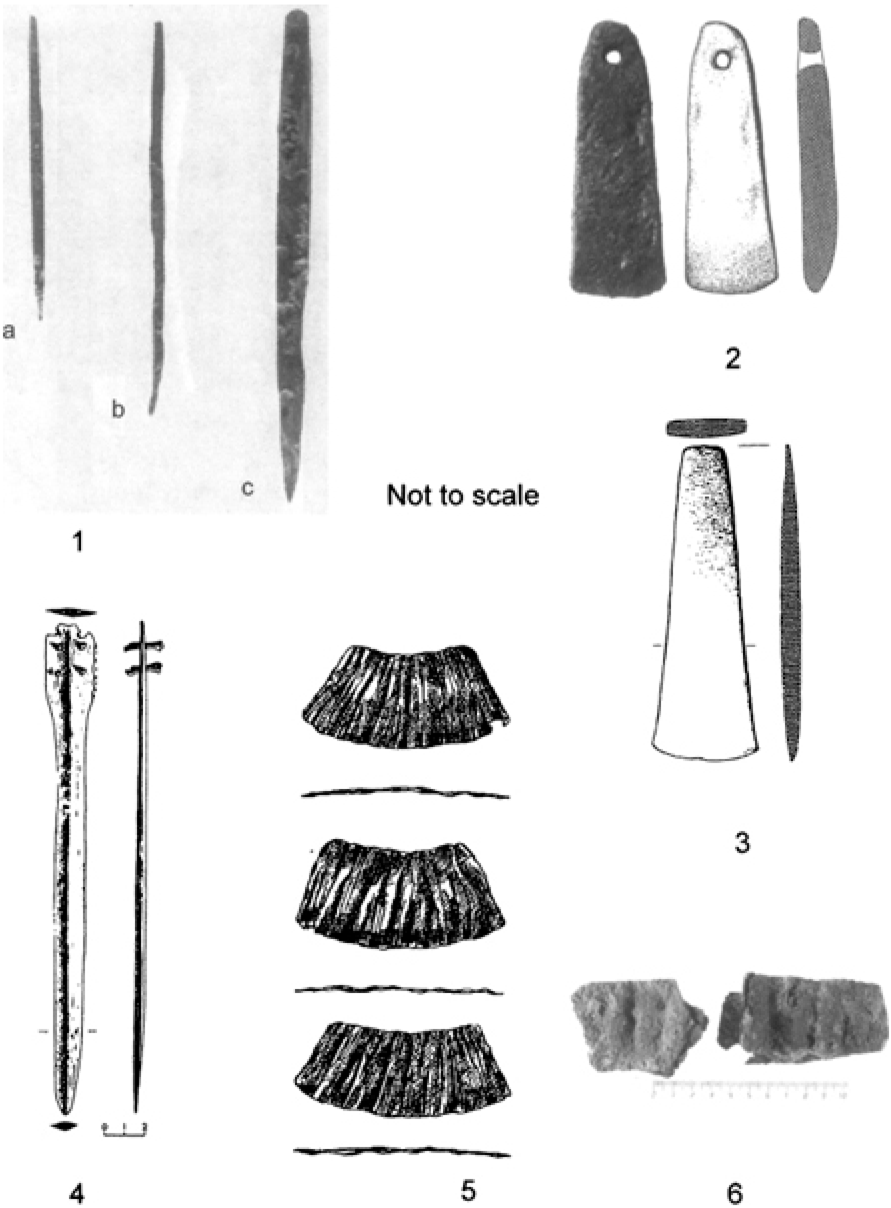


Figure 6.2 Copper objects, EB I–II. 1. Two awls and a chisel, Arad (after Amiran *et al.* 1978:Pl. 70). 2. Axe, T. Dan (after Greenberg 1996b:Fig. 3.44:2). 3. Axe, Lod (courtesy E. Yannai and O. Marder, IAA). 4. Dagger, Givatayim (after Sussman and Ben-Arieh 1966:Fig. 10:1). 5. Copper plaques, K. Monash (after Hestrin and Tadmor 1963:Fig. 14). 6. Copper plaques, H. Ptora (courtesy Y. Baumgarten, IAA).

Table 6.1 Distribution of metal tools and metallurgy from EB sites according to types.

Types / *Sites*	*Awls and borers*			*Axes, adzes and chisels*			*Daggers, spearheads and others*			*Metallurgical remains*			*References*
	EB I	*EB II*	*EB III*	*EB I*	*EB II*	*EB III*	*EB I*	*EB II*	*EB III*	*EB I*	*EB II*	*EB III*	
T. Dan					+								Greenberg 1996b:149–51, Fig. 3.44
R. Haniqra				+	+								Tadmor and Prausnitz 1959; Miron 1992:12, No. 39
Hazor			+						+				Greenberg 1997a
Q. Ata		+		+	+?								Fantalkin 2000:50-51; Golani 2003:13, Figs. 7.7:1-3
Yiftahel				+						+			Shalev and Braun 1997:92-93, Figs. 11.2, 11.3
N. Tabor													Miron 1992:12, No. 38
B. Yerah	+				+	+							Miron 1992:12, Nos. 41-44; Getzov 2006:100, Fig. 3.57:1
Megiddo							?					+	Engberg and Shipton 1934:Fig. 13A; Genz 2001:61
Affula				?									Dothan 1955:38
T.B.Shean	+			+			+						FitzGerald 1935:Pl. III:21, 23; Mazar 1994:57
T.Shuneh				?						+			Philip and Baird 1993:33, Fig. 12:1; 1994; Philip and Rehren 1996; Golden 2002:228; Philip, Glogg and Dungworth 2003:87, Tables 2, 4
Pella		+			+								Philip, Glogg and Dungworth 2003:Tables 1, 2
Metzer				?									Dothan 1957:Pl. 37:C,D; 1959:28; Miron 1992:11, Nos. 29-33
N. Alexander	+			+									Dar 1989–90
K. Monash				+			+						Hestrin and Tadmor 1963; Tadmor 2002
Aphek					+								Miron 1992:14, No. 68
T. Farah (N)	+						+						Miron 1992:13, No.49
Azor	+			+			+			+			Ben-Tor 1975a:22-23, Pl. 22:7, Figs. 12:13; 22:1-3
T. Dalit		+											Sadeh 1996:152, Fig. 70:8-10
Lod	+				+					+			van den Brink 1999; Yannai and Marder 2001; pers. observ.
Givatayim	+			+			+						Sussman and Ben-Arieh 1966:Fig. 10:1; Figure 16:4
Bat Yam							+						Shalev 1992:125, Table 3-A.1
Palmahim	+			+						+			E. Braun, pers. comm.
T. Nasbeh							+						Shalev 1992:Table 3-A.1
Jericho				+		+	+	+	+				Sellin and Watzinger 1913:117, Pls. 104-105; Garstang 1932, 1935; Kenyon 1960:174, Fig. 66:1; 1981:375, Fig. 15:4; Holland 1983:564, Figs. 228:2; 229:3
T. Yarmuth		+	+			+							de Miroschedji 1988:89, Pls. 48:15-16, XXIV:8-9
T. Erani	+			+									Yeivin 1977b:97; Ilan and Sebbane 1989:n.5; Miron 1992:14:Nos. 69-70; Shalev 1994:635
H. Ptora				+						+			Milevski and Baumgarten 2008:615
Lachish										+			Tufnell *et al.* 1958:Pl. 57
T. el-Hesi						+	?						Bliss 1898:38–8, Figs. 70, 72-77; Hennessy 1967:Pl. LXXV:1
T. Hebron			+										Eisenberg 2002, in press
T. Halif										+			Levy *et al.* 1997; Golden 2002:226–7; Figs. 14.1 and 14.2
Arad		+			+					+	+		Amiran *et al.* 1978:Pls. 70:23, 24; 71:1-2, 4-8, 122:8-9; Hauptmann, Begemann, and Schmitt-Strecker 1999
S.T. Malhata	+									+			Ilan and Sebbane 1989:n.5; Rosen 1997c:87; Genz 2001:60
N. Hemar/ N. Zohar		+?											Yekutieli 2004:20–1
B. edh-Dhra						+			+				
Numeira												+	Coogan 1984:77; Genz 2001:60
Nizzanim	+												Yekutieli and Gophna 1994
Barmea	?									+			Golani, pers. comm.
Afridar	+			+			+						Golani and Milevski 1997; Segal, Halicz and Kamenski 2003:Figs. 1:1-4,6,7,11,13; Golani 2004; Baumgarten 2004:178–9, Fig.19:2
Site H	+									+			Macdonald 1932:12; Pls. 24:47, 26:56, 28:2-3; Hauptmann 1989:128; Genz 2001:60
E. Besor	+									+			
W. Feinan	+	+	+	+	+	+	+	+	+	+	+	+	Fritz 1994; Adams and Genz 1995; Hauptmann and Pernicka 1999; Levy, Adams and Najjar 1999; Adams 1999, 2003; Levy *et al.* 2001:168–9, 2002; Craddock 2001:158; Hauptmann 2000
Camel site											+		Rosen 2003b
B. Uvda		+											Shalev 1992:Table 3-A.1
T. Maqass													Khalil 1992; Khalil and Riederer 1998; Genz 2001:59–60

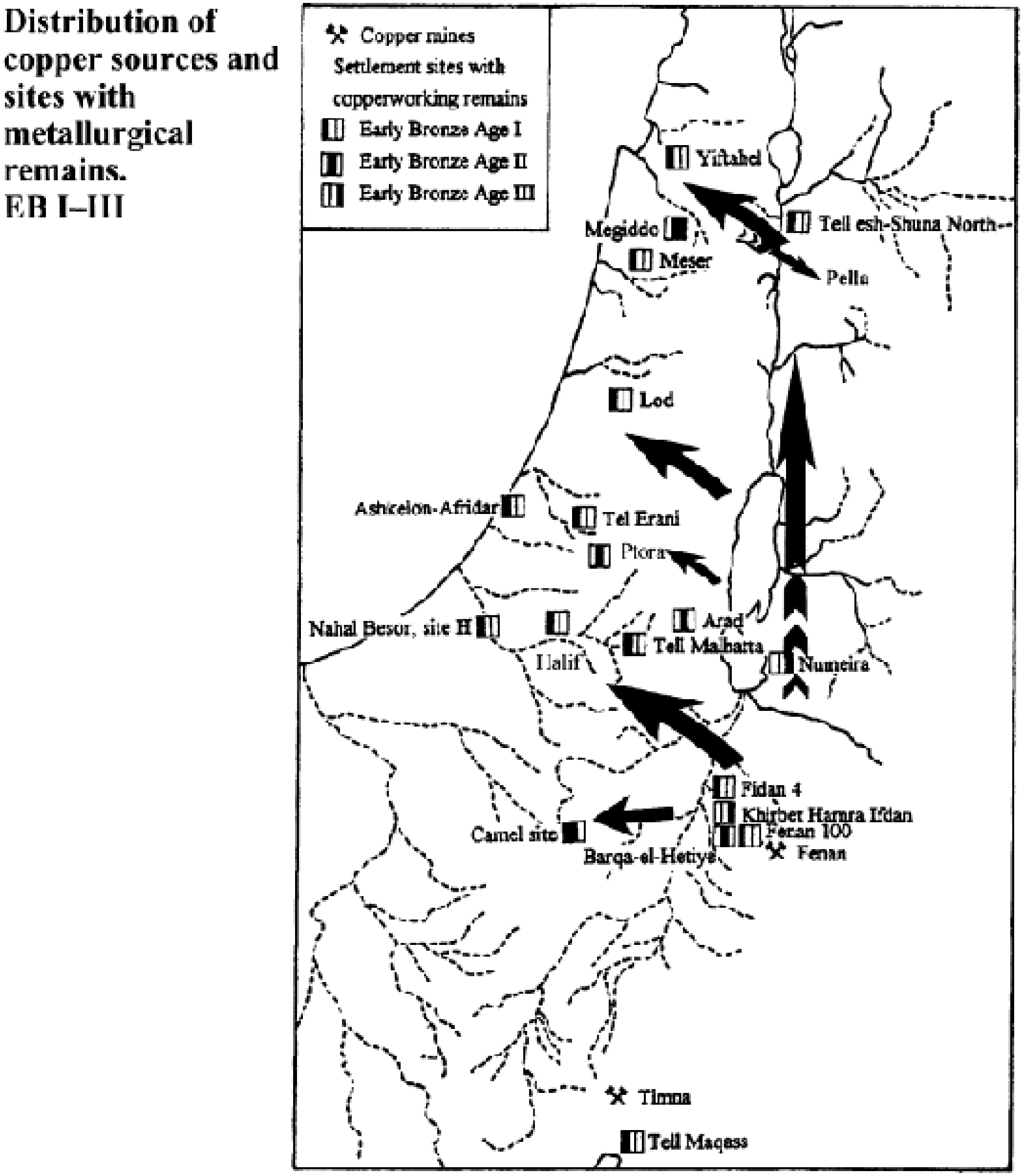


Figure 6.3 Distribution map of copper sources and sites with metallurgical remains, EB I–III, after Genz 2001.

2. Tools and Weapons

Cooper tools and weapons are summarized in Table 6.1 according to period. Most of the data were presented by Ilan and Sebbane (1989) and Shalev (1994; see especially Table 3-A.1) (and see Milevski 2005:169–74). Following is a description of published and unpublished artifacts relevant to the discussion.

A. Pins and Perforators

Pins dated to the EB were found in the Jordan Valley, the Central Coastal Plain and the Feinan area. Awls were found in the Central and Southern Coastal Plain, the Jordan Valley, the Aravah, and the Negev (e.g. Figure 6.2:1a–b). Most of them have squared sections and date to the EB I and II

B. Axes, Adzes and Chisels

Bifacial copper tools and weapons (and see Miron 1992) were found in EB contexts in the Huleh Valley (Figure 6.2:2), the Galilee, the Central Hill Country, the Central Coastal Plain (Figure 6.2:3), the Shephelah, the Jordan Valley and the Northern Negev (Figure 6.2: 1c). It is worth mentioning the Kfar Monash hoard that produced six axe blades, seven slender adzes, and three chisels, together with other tools and weapons. It appears that the hoard should be dated to EB I (Tadmor 2002).

C. Daggers, Spearheads and Other Objects

Daggers, spearheads and other copper objects appear in lesser quantities during the EB Age in the southern Levant. These objects follow a similar distribution as the bifacial tools and weapons. Daggers (e.g. Fig. 6.2.:4), spearheads and other copper objects were found in EB contexts in the the Galilee, the Central Hill Country, the Central Coastal Plain and the Shephelah. Four dagger blades were found in the Kfar Monash hoard together with four spearheads, a macehead, a heavy crescent-shaped object, a saw, and three knives (Table 6.1).

Some 800 (*ca.* 10 × 5 cm), thin, rippled sheets of copper (i.e. plaques) (Figure 6.2:5) were found in the hoard from Kfar Monash as well. Nine additional plaques (Figure 6.2:6) were found in a small cache under an EB I building at Horvat Ptora. The plaques in the Kfar Monash hoard were generally found in groups of ten, adhering to each other as if they were in packages (M. Tadmor, pers. comm.). All of them seem to originate in EB I contexts (and see Tadmor 2002, Sebbane 2003; contra Ben-Tor 1971a, Watkins 1975). These plaques have been identified as probable parts of scaled armor because of their shape and the fact that they are pierced near one edge. Another possible explanation for the function of these objects is that they were a sort of metal unit, a blank ready for the production of tools provided in prefabricated slices and attached with a string through their piercings.[4]

3. Discussion

Archaeo-metallurgical objects and activities are associated with all three phases of the EB Age. The best documented information comes from EB I contexts,

mainly in relation to probably metalworking installations. Awls and borers were found mainly during the EB I period and to a much lesser extent in EB II and III strata. Axes, adzes and chisels are in more evenly distributed throughout the EB Age. We have few examples of daggers and spearheads and their chronological distribution is unclear. Whether this dominance in EB I indicates a real situation or is a result of archaeological bias related to the information available cannot be ascertained at this stage of the research.

EB metal production indicates a change from the Chalcolithic period in production methods and division into different stages of the work. There also appear to be significant differences in development of networks of exchange. Rosen (1996c: 148–9) offers an interesting perspective on metal exchange. He explains it as the replacement of flint bifacials with metal axes, adzes and chisels and claims it caused a disruption of the exchange framework of the Chalcolithic period. Rosen (*idem*) further points out that the existence of new stable exchange routes established for the copper distribution from the sources is not the result of changes in metallurgical work during EB I but came about because of the existence of a new complex society. He endorses the ethnographical example of the Australian aborigines (Sharp 1952) whose flint axes were replaced by steel tools during the European conquest.

It is apparent that the spatial distribution of metal objects changes during the course of EB I and EB II–III periods (Table 6.1 and Figure 6.3). During EB I, with the exception of Yiftahel, metallurgical activities are concentrated in the southern part of the country. Tools and weapons are evenly distributed at EB I and the EB II sites. Weapons appear less frequently during EB II–EB III. The lack of perforators during the EB II–III at sites north of Metzer and Bet Shean, excepting Hazor during EB III, is worthy of mention, as was already pointed out by Ilan and Sebbane (1989), and Shalev and Braun (1997:96). This phenomenon may indicate differences of craft specialization over time in the northern regions.

While there are different settlements where metallurgical activities were performed and a relatively long-distance exchange occured, the sites near the metal sources, i.e. Wadi Feinan, seem to contain the main centers of production, as in the example provided by Rowlands (1971:211). From Wadi Feinan the main routes of distribution of copper and copper tools within the central area were: the Ayalon-Lod Valley, Nahal Sorek, the Southern Shephelah (Nahal Lachish), the Northern Negev including the Arad area in the east (Beersheva Valley), and the Southern Coastal Plain through Wadi Ghazza/ Nahal Habesor. From the Ayalon-Lod Valley it is likely that objects were distributed to the north, via the Sharon Plain. Metal hoards as in the case of Kfar Monash could suggest that these locales were a point of metal exchange. Rowlands (1971:211–12) suggests that the existence of hoards within the archaeological record could be explained by the system of collection and exchange of scrap metal by the smiths.[5] If this is the case for the Canaanean hoards we have to see in Metzer, Kfar Monash and Tel esh-Shuneh, among

others, probable points of exchange of copper artifacts.[6]

Copper objects could have made their way to the Jezreel Valley through the Central Coastal Plain or the Jordan Valley (via the Bet Shean, Harod valleys) where Tel esh-Shuneh was a site of copper related activities. This last site probably reflects the natural and easily accessible routes along the Dead Sea and more northern segments of the Great Rift Valley. Similarly the southernmost site of Tell Maqass probably was an appendix of the southern Aravah exchange, with the ores originating in the Feinan or the Timna areas.

Egypt was part of a secondary area of distribution that probably extended during EB I from the Southern Coastal Plain in Canaan through northern Sinai (and see Golden 2002:232; Gophna and Milevski 2003). Data on distribution of copper tools in Canaan during the same period, and the information from Area E of Afridar, enable us to suggest the possibility that trade in copper and copper products from Feinan during certain stages of the EB was not carried out only by overland route to Canaan, but was also effected by way of the sea from Canaan to Egypt and the northern Levant (Gophna and Milevski 2003; cf. Chapter 10). This could include the site of Tel es-Sakan near Gaza (Miroschedji and Sadek 2000). During EB II and EB III the maritime route was certainly utilized since the land route through northern Sinai was not in use during the Old Kingdom of Egypt until the end of the EB III (Stager 1992).

From known production sites, it appears that copper was produced in small quantities during the EB I in several places. The final products were distributed widely to all the southern Levant. According to Genz (2001:62), EB I was characterized by a range of cottage industries with part-time specialists. However, the assumption that the EB II–III saw an intensification in the production of copper, reflected in the quantities of smelting furnaces and large slag heaps found in the Feinan area (Hauptmann 1989; Shalev 1994:636), must be confined only to the Feinan area, since the evidence from other sites in Canaan does not show an increase in metallurgical remains or metal objects (cf. Genz, *idem*). The quantities of molds from Khirbet Hamra Ifdan point to a large concentration of copper production. The axeheads found at Pella, probably originating in Cyprus and the Taurus mountains, point to a trading network from outside the southern Levant. Though this subject is beyond the scope of this work its significance should be noticed but not exaggerated.

The evidence suggests that during the EB II–III the metallurgical activities were concentrated at few key sites. However, another possibility suggested by Genz (2001) is that the metallurgical activities were conducted in small rural settlements or in areas outside the walls of the urban sites. In this latter case, metalworking could have been the specialty of itinerant craftsmen who, as probably show the paintings of Beni Hasan (Newberry 1893), could have brought their families with them.

Notes

1. In several societies metalworking is not a full-time occupation, and craftsmen participate in the agricultural activities of their family.

2. Note that the dating of the site to the Chalcolithic period was recently changed to the early EB I (cf. Genz 1997:444).

3. Crucibles and molds were also found, but they seem to have originated in the Chalcolithic strata of the site.

4. I want to thank Y. Baumgarten for this suggestion.

5. There are cases where worn and disused metal objects are given in exchange for new tools and weapons.

6. Philip (1988) has given a different interpretation based on theories of ‘conspicuous consumption’; cf. Chapter 2.

7

Botanical Commodities

1. Archaeobotany and Ethnohistoric Sources

The archaeobotanical data base for the EB has been considerably enlarged in the last years due mainly to the dendro-archaeological research carried out by Lipshchitz, Lev-Yadun and other scholars.[1] In general, archaeological evidence for the domestication of plants in the region has been fully investigated in the last decades (Redman 1978; Zohary and Hopf 1993; Zohary 1996; Buxó 1997; Cauvin 2000).

Until recently, exchange of wood and agricultural products during the EB was generally related to international trade. Ben-Tor (1986:5, 9) and Ward (1991:14) maintain that the textual evidence provide evidence for wood by-products having been exported from Palestine to Egypt in small jars and bottles. We also have the later story of Wenamum (cf. Gardiner 1932:68), where he was sent to Byblos to acquire wood for the boat of Amun. International exchange of wood seems also to have occurred along the Levantine coasts during the EB IA, as registered by the presence of cedar of Lebanon (*Cedrus libani*) in the site of Afridar (Gophna and Liphschitz 1996). In addition, analysis of the contents of Canaanite EB II jars (some of them from MW) from the Tomb of Djer indicated that they contained remains of vegetable oil (Serpico and White 1996). Written sources on the exchange of agricultural products for biblical periods indicates that wheat, olive oil and balm were traded by sea from the kingdoms of Judah and Israel to Tyre (Ez. 27:17), and oil was transported to Egypt (Hosea 12:1).

Comprehensive studies of agriculture and agricultural products in the southern Levant during later periods have included data on the Iron Age (e.g. Borowski 1979), the Roman-Byzantine period (e.g. Feliks 1963) and the Middle

Ages (e.g. Amar 2000). Yet the exchange and trade of agricultural goods was almost not addressed in these works, or was again related just to international trade. Furthermore, documents from Mesopotamia (3rd millennium BC) testimony to an exchange of wood and agricultural products with peripheral and outer regions. Lebanese cedar, ebony and palms from Bahrain, wood from the 'mountains' and other wood are cited in the documents compiled by Pettinato (1972:84–9). Crops are also mentioned in these documents, with sesame and barley exported to Bahrain and dates and reeds being imported from this locale and others to Isin (Pettinato 1972:90–1).

Late Egyptian written sources provide us with evidence for the local exchange of products. The Middle Kingdom (21st century BC) story of the 'Eloquent Peasant' (Pritchard 1955:407, and see below) mentions this peasant traveling northwards after he had loaded his donkeys with *iaa*-plants, *rermet*-plants, and anis, among other products, to be exchanged during his journey.

Ethnographic studies provide numerous case studies of local exchange of crops. For example, this subject is dealt with in a study of villages in the west Bengal Hills, India (Muga 1977). Several crops are almost wholly exported out of the villages and the trade of these items is controlled by the village merchants, especially the Marwari and Newari traders (Muga 1977:196). These merchants have their own warehouses or rent storage space from one another. The crops are stored in the warehouses and released to the open markets of faraway villages and cities like Calcutta. A second type of cash crop is composed of local surpluses which are utilized by the local peasant farmers for cash trade. Such crops are farmer controlled and used almost exclusively in the local petty markets for generating cash incomes. Certain types of valuables and better quality crops, are traded directly by the farmers (Muga 1977:198–9).[2] The farmer-traders of the village are thus working as middlemen between other villages and farmers and the village merchants. They are buffer agents between the farmer and the cosmopolitan merchant (Muga 1977: 199)

In South America, the Aymara of Titicaca Lake in Bolivia travel to the valleys of the Pacific coast in order to obtain guano (LaBarre 1948:24, 151). According to Garcilaso de la Vega (1869 VII:1):

> The Collas conveyed large quantities of quinua and chuñu, and of dried meat called charqui, on the backs of their llamas, to the valleys, returning with loads of maize, uchu, and fruit, which are not to be had in their land.[3]

In Palestine, medieval sources describe the trade of agricultural products, mainly in relation to the taxes paid to the authorities. For instance, oil, wheat and dates are documented as part of the trade and taxes or 'gifts' given to a monastery by landowners in the Early Islamic period (Kraemer 1958). *Pistacia* nuts are registered as having been sold in Jerusalem and taxed by the Mameluke government (Amar 2000:161, 219).

2. Distribution of Species

The data presented in this section follows Milevski 2005:180–90 (and see Table 7.1 and Figures 7.2–7.4). Most of the information is based on Liphschitz's works with additional data deriving from the last decade of research (cf. Genz 2003 with bibliography therein).

According to Zohary (1962; 1966; 1972) and Feinbrun-Dothan (1978; 1986), the flora of the southern Levant can be divided into seven groups, with general distribution areas. Eig (1939), followed by Zohary (1962) and Orni and Efrat (1971:164–77), divided the country into four main phytogeographical areas[4]:

1. The Mediterranean zone, that includes (a) the Central Hill Country and the Galilee, (b) a lowland region (the Shephelah and the northern valleys), (c) a transition type, (d) a high-mountain type and (e) a dune vegetation zone in the coast.
2. The Irano-Turanian zone, a dry steppe located in the Jordan Valley, and the Northern and Central Negev. Danin and Plitmann (1987) have defined the Irano-Turanian as the Transition zone, arguing that there is no real Irano-Turanian in the country.[5]
3. The Sahara-Arabian zone, a desert that includes (a) the Judean Desert, the Aravah and the Southern Negev, apart from (b) a halophytic vegetation zone north and south of the Dead Sea and the Aqaba Gulf;
4. The enclaves of the Sudanian zone in the Jordan Valley and next to the Dead Sea.

The data dealt with here is based on four groups: cereals, olives and grapes, trees (other than olives), and pulses. We describe the main species and sites in the text, while others are only presented in Table 10. Olives (*Olea europaea*) and grapes (*Vitis vinifera*) are the mainfruit species (Zohary and Hopf 1993; Zohary 1996) and for this reason we will present them separately. Both species appear in this region before the EB Age, but is during the EB Age that a noticeable increase occurred in the numbers of their pits, dried fruit and wood (Zohary and Hopf 1993; Zohary 1996; Liphschitz and Bonani 2000; Genz 2003) as well as an increase in the levels of olive pollen found in the sea of Galilee (Baruch 1986:45). For the sake of convenience we will present the data according to geographic areas (as well as the other commodities), but we ask the reader to compare these with the phytogeographical areas listed above.

A. Cereals

As no data is available for the Galilee, the northernmost part of the country to

have yielded cereals is the Jordan Valley. At Bet Shean, FitzGerald found quantities of barley and wheat in large stone jars within Stratum XIII, dated to the EB II (see Feinbrun 2004).

In the eastern Jordan Valley, at Tel Abu al-Kharaz charred plant remains from EB IB and EB II strata were analyzed and were dominated by *Triticum monoccocum/dicoccum* (einkorn/emmer wheat) (Fischer 1997). Close to the south, Tel es-Saidiyeh (EB III) produced whole, charred grains of *Triticum* sp. and *Hordeum* sp. (barley) (Cartwright 2002:110–11). Plant remains from Jericho published by Hopf (1969, 1983) contained more varied examples of species *inter alia*, barley and wheat.

The Shephelah has produced several sites with archeobotanical remains. At Lower Horvat Illin charred seeds from emmer wheat were found in late EB IB contexts (Segal and Carmi 1996:91). The archaeobotanical report from the NE section at Lachish (Helbaek 1958) mentions the existence of emmer wheat, hulled barley, among other species, but does not specify to which phase within the EB the remains belong. In the southern Shephelah, at Tel el-Hesi (Toombs 1983:40), the uppermost floor in Phase 4e (EB II or III) was covered with ash containing quantities of different seeds, the main one being emmer wheat (Toombs 1983:44).

In the Southern Coastal Plain, the late EB IB strata at the site of Palmahim Quarry has produced both grain and forks of *Triticum diccocum* (E. Braun, pers. comm.).[6] Remains of *Triticum* sp. was found at the EB IA site of Afridar, Area E2 while the En Besor oasis Strata III and IV (EB IB) produced grains of wheat and barley (Liphschitz 1995).

In the Northern Negev the main site producing archaeobotanical evidence is Arad (Hopf 1978), where about 60 kg of plant remains were recovered from the site. Most of this material came from strata dating to EB II. Among these remains, barley (Figure 7.1:2, 7A) is the dominant cultivated plant, followed by emmer wheat (Figure 7.1:1, 7B) and other species of this grain.

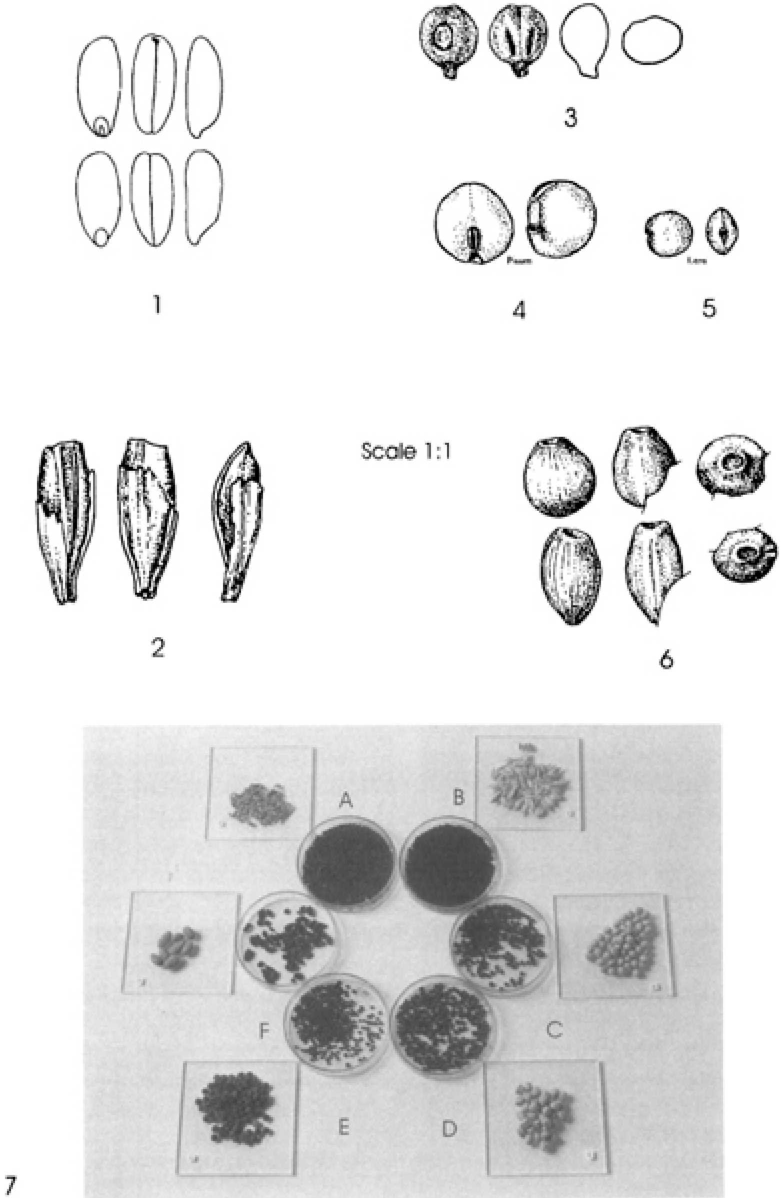


Figure 7.1 Archaeobotanical finds from Arad. 1. *Triticum diccocum* (wheat). 2. *Hordeum vulgare* (barley). 3. *Vitis vinifera* (grapes). 4. *Pisum* sp. (pea). 5. *Lens culinaris* (lentil) 6. *Pistacia atlantica* (Atlantic pistachio). 7. Archaeological samples (charred) and modern species. A. Barley. B. Wheat. C. Pea. D. Chickpea. E. Flax. F. Olives. (Nos. 1-6, after Hopf 1978; no. 7, after Amiran and Ilan 1993:Abb.24, courtesy of the Israel Exploration Society).

Table 7.1 Distribution of botanical remains, EBI-III.

Sites	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
Species																																			
Wheat		I, III		I–III		II			III	I–II			+					+	I		+			+		I		I	II	+	III	I			
Barley		I, III	III			II			III				+					+			+							I	II	+	III	I			
Oat													+								+											I			
Lentils		I, III	III			II				I–II			+								+		III						II	I	III	I			
Pea			III																									I	II						
Vetch				I		II				I–II							II	+			+								II						
Chick pea													+								+								II	+	III	I			
Grass pea																					+									+					
Flax										I–II			+																II		III	I			
Olive wood	I–II	I, III	III	I,III			II–III		III	I–II			+	+		II	I, II	+	I	III	+					I			I–II			I	II–III	II–III	
Olive pits		I, III		I–III	III		II–III	I	III		II	III			I		II	+		III	+	I	I, III	III		I	I		I–II	+	III				
Grape			III?				II–III		III	II		III	I–III		I			+	–	III	+			III			I	I	II	+	III	I			
Pistachio		I, III																+			+			+					II	+	III				II
Terebinth		I, III		I–III					III											+		+													
Oak		I, III		I?					III								II			+							I		I						
Turkey oak																											I								
Tamarisk		I, III																		+								I	II	II					II
Aleppo pine		I, III															II						III								?				
Lebanon cedar																											I								
Pomegranate																		+						+					II						
Fig													+					+												+	III	I			
Hawthorn																					+														
Saxaul																																			II
White broom																																			II
Palm													+															I		II					II

Sites: l:Kabri; 2:Megiddo; 3: T. Taanakh; 4:T. Qashish; 5:Bet Yerah; 6:T. Bet Shean, 7: K. ez-Zeraqon; 8:Pella; 9:T. es-Saidyeh; 10:T. Abu al-Kharaz; 11:T. el-Handaquq (N); 12: T. el-Handaquq (S); 13: Jericho; 14: Jerusalem; 15:Sataf; 16: T. Aphek; 17:Tel Dalit; 18:Gezer; 19: H. Illin; 20:T.Yamuth; 21: Lachish; 22: T. Erani; 23:T.Halif; 24: T. el-Hesi; 25: Palmahim 26: Afridar; 27:Nizzanim; 28: E. Besor; 29: Arad; 30:B. edh-Dhra; 31: Numeira.; 32:W. Fidan 4.; 33: Feinan 9; 34: Feinan 16; 35:B. Uvda. Roman numbers relate to periods within the EB, viz. I = EB I, II = EB II, and III = EB III. Sites without specific periods are marked with +.

For the eastern Aravah site of Wadi Fidan 4, Meadow (1996)[7] analyzed 26,000 items of carbonized plant material from 21 samples from within a Stratum IIB structure (early EB I) and associated ovens. The latter in particular revealed a wide variety of well-preserved plant macrofossils. The assemblage (Adams 1999: Table 5.1) was dominated by emmer wheat chaff (over 60% of the assemblage), but also contained barley chaff and barley grain, wheat grain, millet and wild grass seeds.

B. Olives and Grapes

Olives

In the Galilee, wood of *Olea europea* was found at Kabri (Liphschitz 1992:29) and dated to EB I–II. Pits and wood were found at Megiddo (Liphschitz 2000a:488–90) and dated to EB I and III. At Tel Qashish (Liphschitz 2003) wood and olive pits were found in EB I and EB III contexts, and perhaps EB II. At Beth Yerah (Maisler, Stekelis and Avi-Yonah 1952:227), and Tel Taanakh (Lipschitz and Waisel 1980), olive pits were found; all contexts indicate an EB III date.

In the Jordan Valley, and other sites in Transjordan the picture is as follows. At Khirbet Ez-Zeraqon pits and wood were found in EB II and III contexts (Neef 1990:31). At Pella an EB I context produced some pits (Bourke, Sparks and

Mairs 1999: 60). At Tel es-Saidiyeh, Cartwright (1996:73; 2002:109–10) reports pits and wood from EB III contexts with a possible evidence of *jift* used as fuel. At Tel Abu al-Kharaz pits were found in an EB II stratum (Fischer 1997:162), while both at Tel el-Handaquq North and South olive pits were found in EB III contexts (Donaldson and Mabry 1996:142; Chesson 1997:67).

In the Central Hill Country, Liphschitz (1986, quoted in 1989) reports the existence of *Olea europea* pits at the City of David, Jerusalem during the EB I–II, without any specification of stratum, and Gibson (1991:51) reports pits as well from an EB I context at Sataf.

Several sites in the Shephelah have produced archaeobotanical remains with olives. At Horvat Illin olive seeds and wood remains were found in late EB IB contexts (Segal and Carmi 1996:91). Nearby, the excavations conducted by Ben-Tor at Tel Yarmuth retrieved carbonized olive pits from EB III (Ben-Tor 1975b:73, n. 31), while the production of olive oil during this period was reported by de Miroschedji (1999:8–9; cf. below). Olive pits were also found at Gezer (EB I?) (Liphschitz 1989:272; cf. Macalister 1912:22–8). From Lachish NW settlement, olive pits are also reported and dated to EB II-III (Helbaek 1958:313). From the renewed excavations, Liphschitz (2004b:2231) reported wood samples of *Olea europea* from an EB III context. Some kilometers to the west, Tel Erani produced olive pits from the early EB IB strata (Kempinski and Gilead 1991: 186). To the south, Tel el-Hesi yielded olive pits from EB III contexts (O'Connell and Rose 1980:86).

In the Central Coastal Plain, EB II contexts from Tel Aphek (Liphschitz, Gophna and Lev-Yadun 1989:264; Lipschitz 2000b:Tables 16.1–16.2) and Tel Dalit (Liphschitz 1996b:186) yielded olive wood, and wood and pits remains, respectively. Further to the south, the EB IA and IB strata of the site of Palmahim Quarry have also produced several olive pits. To the south, olive pits were found in EB I contexts at Nizzanim (Gophna and Liphschitz 1996:146). Areas E, F, G and J at Afridar, revealed the massive presence of olives (90% of the identified timber) (Gophna and Liphschitz 1996:146; Liphschitz 2004a).

Sites in the Northern Negev have produced evidence of olives from EB I and II contexts; pits and wood from Tel Halif (Seger *et al.* 1990:23) and Arad (Hopf 1978:72–3; Liphschitz 1996a: 166–7) (Figure 7.1:7F). In the eastern Aravah olive wood dating to the EB II–III was found at Feinan 9 and 16 (Baierle *et al.* 1989:216, quoted by Genz 2003:Table 1), while at the eastern plain of the Dead Sea, EB III strata at Bab edh-Dhra and Numeira produced olive pits.

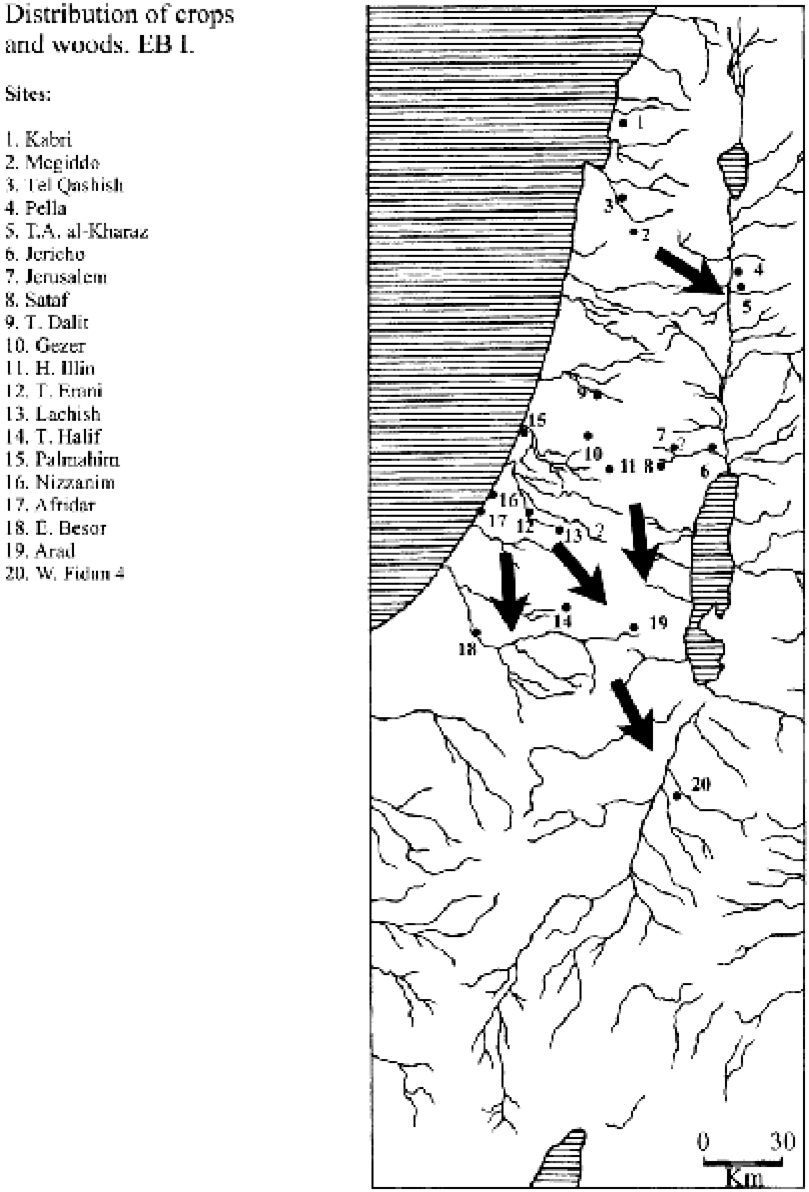


Figure 7.2 Distribution map of botanic remains during the EB I.

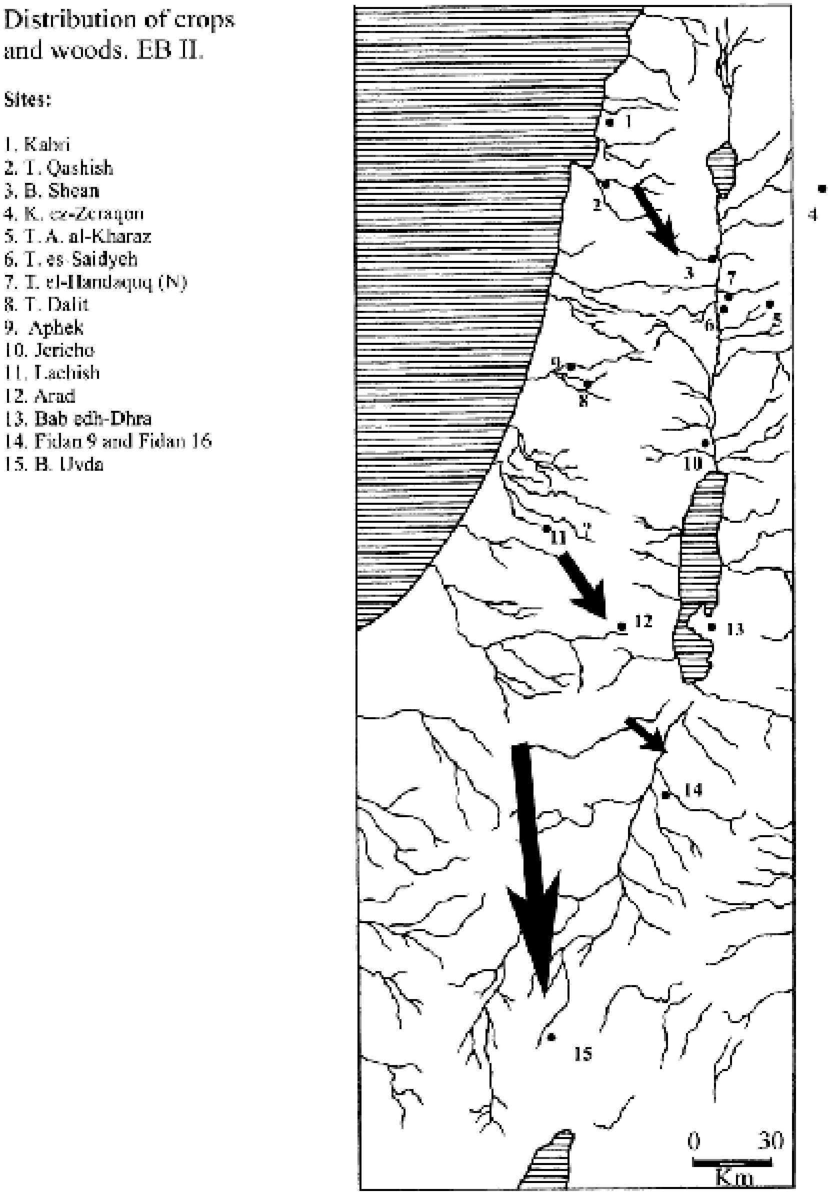


Figure 7.3 Distribution map of botanic remains during the EB II.

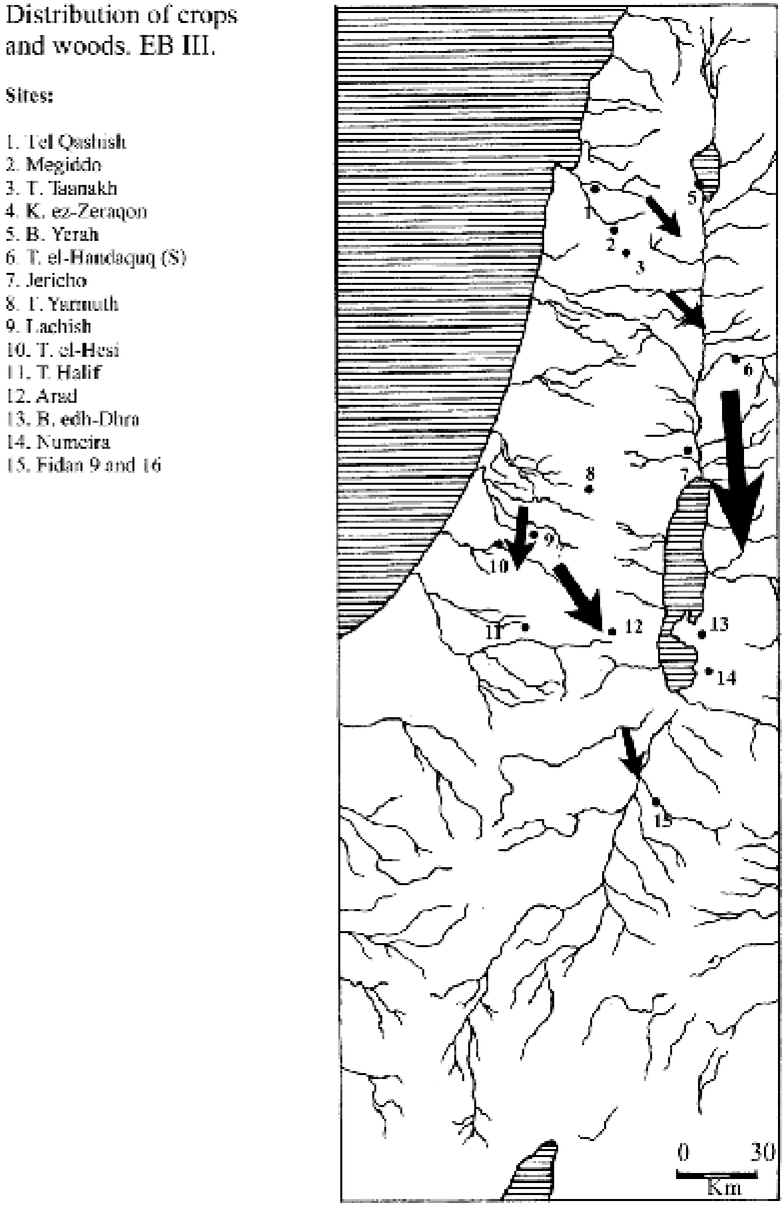


Figure 7.4 Distribution map of botanic remains during the EB III

Grapes

The northernmost site where grapes *(Vitts vinifera)* were found is EB III Taanakh in the Galilee (Lipschitz and Waisel 1980). Pips and dried fruit were found in several EB II and EB III sites of Transjordan: Tel Abu al-Kharaz (Fischer 1997:162), Tel es-Saidiyeh (Cartwright 1996:73; 2002:103–6) and Khirbet ez-

Zeraqon (Genz 2003:65, Table 3).

Remains from Jericho (Hopf 1969; 1983:567) contain samples of grape pips and dried fruits dating from EB I through EB III.

Grape pips are also reported from Lachish NW settlement (EB II–III) (Helbaek 1958:310) and EB III contexts at Tel el-Hesi (Toombs 1983:40). Grape pips were also found in EB IB contexts in the site of Palmahim Quarry on the Coastal Plain (E. Braun, pers. comm.), and at En Besor in EB IB contexts (Liphschitz 1995:232).

The only site where wood remains were found together with grape pips (Figure 17:3) is Arad, in EB II contexts (Hopf 1978:73–4).

At Bab edh-Dhra and Numeira, in the eastern plain of the Dead Sea, pips and dried fruit were found in EB I to III contexts (Richardson 1976:56; McCreery 1979:166). In the eastern Aravah, grape seeds were found in early EBI contexts at Wadi Fidan 4 (Meadow 1996:18, quoted by Genz 2003:Table 3).

Trees Other than Olives

In the Jezreel Valley wood remains of *Quercus calliprinos* (Kermes oak) and *Pistacia palaestina* (Terebinth) were found at Tel Qashish (Liphschitz 2003) in EB I and EB II–III contexts. Excavations of the Tel Aviv mission at Megiddo identified both species from EB I and III contexts (Liphschitz 2000a:Table 17.1). These species dominated the arboreal community of the Mediterranean region in antiquity (Liphschitz and Bigger 1990). Remains of Alepo pine *(Pinus halepensis)* and tamarisk *(Tamarix)* were also found in EB I contexts at Megiddo (Lipschitz, *idem)*.

In the eastern Jordan Valley, charred nuts of *Pistacia palestina* and charred fragments of *Quercus* sp. appear in EB contexts at Tel es-Saidiyeh (Cartwright 2002:108). In the Yarkon and Ayalon basins, botanical remains revealed the presence of *Quercus calliprinos* at Tel Aphek and Tel Dalit during the EB I–II (Liphschitz, Lev-Yadun and Gophna 1987:48–9, Liphschitz 1996b, 2000b:Table 16.2A).

In the Southern Coastal Plain, a nutlet of *Pistaccia palaestina* was found in an EB IB context at Palmahim (E. Braun, pers. comm.). Areas E and G at Afridar have yielded several types of trees: tamarisk, lentisk, terebinth, shrubby salt bush and acacia (Gophna and Liphschitz 1996; Liphschitz 2004a). Furthermore, remains of two types of cedar of Lebanon were found at the same site (Gophna and Liphschitz *idem*, Braun and Gophna 2004) together with *Quercus cerries* (Turkish oak), a tree that covered the mountains of Turkey and Lebanon during antiquity (Liphschitz 2004a:309). At En Besor (Liphschitz 1995) the wood remains from the EB I included tamarisk and date palm.

In the southern Shephelah, terebinth wood was found at Lachish (EB III) (Liphschitz 2004b:2233). At Tel el-Hesi, pistachio was reported from EB III, although no find spots are specified (Toombs 1983:44).

In the Northern Negev, most of the wood remains from Arad were recovered

from EB II contexts, with charcoal samples showing the presence of oak, tamarisk, *Retama raetam* (White broom), *Pistacia atlantica* (Atlantic pistachio) (Figure 7.1:6), *Pistacia palestina*, *Quercus calliprinos* and *Curpessus sempervivens* (Cypress; Hopf 1978; Liphschitz 1996a: 166–7).

The analyzed material retrieved from ovens in stratum IIB from Wadi Fidan 4 in the eastern Aravah revealed a wide variety of well-preserved macrofossils of oats, pistachio shells and hawthorn nuts, the latter in smaller numbers (Meadows 1996)

The southernmost area where wood remains have been found dating to the EB is Biqat Uvda, in the southern Arava Valley. Liphschitz (2001) has collected data from sites 909, 910, 916 and 917, excavated by Beit Arieh (2001), dating to EB II. Relevant to our research is the fact that together with *Tamarix aphylla* (Tamarisk), *Phoenix dactilifera* (Palm), *Haloxylon persicum* (White saxaul) and *Retama raetam*, several remains of *Pistacia atlantica* were found at site 917. While the first four species are characteristic of the Southern Negev and the Aravah, pistachio originated in the Central Negev or further north (e.g. the Mediterranean woodland and shrub region [Moldenke and Moldenke 1952:170, 201, 227]), and must have been brought to the site from these regions. Sources from the Islamic period illustrate that pistachio grew in the mountains of Syria and Palestine (Amar 2000:219).

Pulses

In the Jezreel Valley, seeds of vetch (*Vicia*) were found in EB I contexts at Tel Qashish (Liphschitz 2003) while *Lens culinaris* (lentils) and *Pisum* (peas), were reported at Taanakh from EB III (Lipschitz and Waisel 1980).

In the Jordan Valley, the FitzGerald excavations at Bet Shean provided substantial quantities of lentils and *Vicia faba* seeds from Stratum XIII, dated to EB II (Feinbrun 2004). In the eastern Jordan Valley, vetch and lentils were found at Tel Abu al-Kharaz. (Fischer 1997). Plant remains from EB Jericho (Hopf 1969) contained lentils as well.

For the Shephelah, vetch and peas were found in the NW settlement at Lachish (Helbaek 1958).

The majority of botanical remains from EB IB contexts at Palmahim Quarry consisted of 763 seeds of vetch (E. Braun, pers. comm.). Lentils were also found at the site in EB I B deposits, but in smaller quantities.

At En Besor (EB I), seeds of pea and vetch were found (Liphschitz 1995). Pulses were found at Arad during EB II (Hopf 1978) (Figure 7.1:4–5, 7C-D). Beans (*Phaseolus sp*) were found at Tel Halif and dated to the EB (Seger *et al.* 1990: Table 2). At Wadi Fidan 4 (Meadow 1996), small-seeded legumes appear in small quantities.

3. Discussion

On the basis of the botanical data and paleo-climatic conditions, Liphschitz (1989:275) concluded that crops and wood were transported from place to place. She has assumed that fruits cultivated in the oases were also distributed to other regions of the country.

Figures 7.2–7.4 show that the movement of crops and wood was from the center of the country to peripheral regions. In some cases, such as pulses, the movement was from the Mediterranean phytogeographical zone—with an annual rainfall 400–1000 mm—to other zones like the Beth Shean and Jordan Valley, the Northern Negev and the plain southeast of the Dead Sea (Bab edh-Dhra and Numeira) and the eastern Aravah.

While barley is grown today by the Bedouin in the Negev, wheat is cultivated in areas where the mean annual rainfall is above 225 mm and where the growth season is longer than 90 days (cf. Liphshitz and Waisel 1973). The Bedouin utilize terraces built during the Byzantine and Early Islamic period, when irrigated terraces were utilized for growing cereals (Avni 1996:77, 84 with bibliography therein). Since it is difficult to presume that wheat and other cereals were cultivated by irrigation during the EB, it is reasonable to assume that these products were imported into the warmer and dryer regions (but cf. Avner 1990).

The same can be assumed for olives, which cannot grow even with irrigation in these arid areas because of the high temperatures (Liphschitz and Waisel *idem*). Amar (2000:157–61) concludes from archaeological and written sources dated to the Byzantine and Early Islamic periods (i.e. Kraemer 1958) that olive trees and oil production existed in the Northern Negev and part of the Aravah. However, part of the data he cites is not accurate.[8]

The olive, oak and terebinth wood samples from Arad have been interpreted by Liphschitz (1996a: 166) as 'imports' from the Hebron mountains on the grounds that the Arad region is poor in timber resources since it has less than 250 mm of annual amount rainfall.

It is possible that during the EB II–III certain oil producing centers existed at Hazor (Greenberg 1997b:IIIs.1:11, 2:4, 3:5, 7), Bet Yerah (Esse 1991:123–5), Kh. Ez-Zeraqon (Genz 2002:Taf. 1:1, 3:2, 24:1), Tel es-Saidiyeh (Tubb and Dorrell 1993:62–6), Tel Yarmuth (de Miroschedji 2000b:Figs. 18.4:12, 18.7:4, 18.10:4) and other sites where pottery vats and certain installations were found (cf. Genz 2003:61–6). Ilan (2001:346, 350) has pointed out that during the EB II, 'Ai contained four times more kraters (e.g. Callaway 1972:Pls. 29:5, 50:25) than Arad and that these vessels were used in the manufacture of oil. Loci containing stone tools, pottery spouted vats, twin bowls, and kilns at those sites were interpreted as installations for oil production on the basis of comparative later descriptions of this craft during Roman times (Esse 1991:124). It looks as if these centers could have benefited from taxes paid by surrounding villages that provided their urban counterparts with olives, as in the late examples provided by medieval sources. The granary building at Bet Yerah, dated to the EB II–III (cf. Mazar 2001; Greenberg 2006), could be a case where villages

brought their crops, or a portion of their produce, to a central administration as payment of direct taxes.

Other fruit trees such as pistachio, oak, hawthorn and the various species of *Prunus*, which require low temperatures for cultivation, must also be seen as products exchanged to the arid zones. Atlantic pistachio (*Pistacia atlantica*), for instance, was probably brought to Biqat Uvda from the Central Negev or further afield (Liphschitz 2001); and Bear's plum (*Prunus sp*) which grows in the Mediterranean *maquis* and forests, was found at Numeira.

Crop exchange seems to have been conducted mainly between settlements situated in close proximity but lying in different phyto-geographic regions, as in the examples of the Aymara in Bolivia traveling to the Quechua area, or the example of Botswana where a common locality was fixed by the !Kung San people for exchanging agricultural and other products within the framework of a ceremony called *hxaro* (Wiessner 1977).

From the data presented above it is possible that sites like those of Biqat Uvda, Arad, Bab edh-Dhra and Numeira received cereals, olives and other fruit from the hill country. The point made by some scholars conjecturing on irrigation systems for agriculture in the case of Bab edh-Dhra, Numeira (Richardson 1976:56) and Tel el-Handaquq (Mabry 1989:59) cannot be taken seriously into account, since it has not been unequivocally proven that such systems existed during the EB (cf. McCreery 1979:167).[9] It is probable that during the EB I, the villagers controlled trade in agricultural products more or less independently, as in the case of the Marwari and Newari traders of the west Bengal hills in India (Muga 1977). Merchants providing other commodities from the Negev and other semi-arid areas could return with crops from the lusher areas in the center, as in the case of the Aymara of the Titicaca Lake in Bolivia (LaBarre 1948).

Aleppo pine nuts, encountered at Tel Halif, were also probably exchanged with communities inhabiting the Mediterranean *maquis* and forest and *batha* of the mountain areas in the central and northern part of the country. The suggestion that the nuts were locally harvested, supporting the theory that the Negev was more humid during the early 3rd millennium BC (e.g. Hopf 1978; Fargo and O'Connell 1978) cannot be totally rejected (see Avner 2002). However, according to Lipschitz (1989, 2001), it is evident that the same arboreal species and therefore a similar macroclimate characterized the Negev from the Early Bronze Age onwards.

According to Borowski (1979:12–13), the first large-scale agricultural surpluses that enabled full-scale trade in agricultural products occurred during the Iron Age. He quotes the exchange of cedar wood from Lebanon with oil, wine and wheat during the reign of Solomon (1 Kgs 5:25; 2 Chr. 2:9, 14). However, this sort of exchange already took place during the EB I as the charcoaled remains of cedar of Lebanon from Afridar have proven (Gophna and Liphschitz 1996). During the EB II–III it is probable that the extent of surpluses increased, and the temple and palaces took control of them, as in the case of

the probable granary at Bet Yerah (cf. Mazar 2001). Other places which appear to have a concentration of several kinds of trees are Megiddo and Tel Qashish, mainly dating to the EB I and III.

In general, the problem of exchange over a long distance is not related to technical questions but to socio-economic ones. To facilitate the use of agricultural surplus for payments in exchange for imported goods, a tax collecting system was developed by the monarchy during the Iron Age. This political power not only utilized the agricultural surplus of the farmers but was a major owner of agricultural lands (2 Sam. 12:8, 1 Chr. 27:25–31), as also testified to by epigraphical records (e.g. Welten 1969).

Moreover, runoff farming or flood agriculture was introduced only during the Iron Age. Water collection systems into cisterns for agricultural and drinking purposes seem to have existed in the Negev and the Judean Desert from the beginning of the Iron Age II (Evenari *et al.* 1958; Stager 1976).

In sum, the EB exchange of crops and timber seemed to have been restricted to those areas in the center and north of the country suitable for the cultivation of cereals, olives and grapes. The arid zones probably received these products through exchange of local products with nearby regions with a higher rainfall.

Few cases of timber exchange are shown, as in the case of the remains of *Pistacia atlantica* from Biqat Uvda, which originated in the Northern Negev or further afield, as well as some of the other species found at Arad and Biqat Uvda, both of them during the EB II. Lipschitz and Biger (1995) have related the trade and import of timber from the MB onwards to urban expansion and the necessity of using larger trees for building activities. While we have evidence for imported wood during the EB LA from Afridar (cedar of Lebanon and Turkish oak), we still lack data in order to complete our understanding of timber exchange during the EB II–III.

Finkelstein and Gophna (1993) have drawn attention to phenomena relating to the trade of agricultural products, and the intermediary role of settlements located between the lowlands and highlands. Based on Mesoamerican and Iranian examples (Rathje 1971; Wright and Johnson 1975), they point out that Egyptian demands for Canaanite goods accelerated the expansion of settlement in the Hill Country during the EB, and encouraged the development of marketing stations in the south as well as the growth of social and political stratification in the southern Levant. The relationship between Egyptian trade, settlement growth and urbanization has been the subject of several works (e.g. Gophna 1987; Kempinski 1992; Milevski 1993), but unfortunately this is beyond the scope of this study.

Notes

1. On dendroarchaeology and dendrochronology see Liphschitz 1986, 1988.
2. The price of the crops not only depends on harvesting and the villagers need for

food, but also on the season of harvesting and the possibility of storing the crops over time.

3. This trade took place with the Quechua to the west. Cieza de Leon mentions maize, fruits, coca and especially honey being brought up from the yungas to the east by the Colla *mitamaes* or colonists (LaBarre 1948:152). Indians of the *altiplano* trade salt in particular but also chuñu, tunt, kaya, pitu, quinua, kañawa, immature barley, and charqui with the yunga for coca, fruit, barley, maize, corn-meal, wheat flour and soqosa (a kind of bamboo from which they make their musical instruments).

4. Zohary (1966) renamed some of the phytogeographical regions and termed Eig's Saharo-Sindian as Saharo-Arabian and Eig's Sudano-Decanian as Sudanian. Eig's Sudano-Decanian enclaves in the Dead Sea area became a 'territory of Sudanian penetration' (Zohary 1966).

5. I am indebted to Ori Fragman-Sapir (Jerusalem Botanical Gardens, The Hebrew University) for this and other references relating to crop growing.

6. The plant remains from Palmahim are still unpublished. The author thanks E. Braun, the director of the excavation, and Yoel Melamed who analyzed the botanical remains from the site.

7. The quotations from Meadow's dissertation were taken from the works of Adams (1999) and Genz (2003).

8. For instance in the preliminary report, the excavators of Kfar Shahak (Nahlieli and Yisrael 1984) noted the presence of olive pits in a hearth on the floor, but no olives were reported in the botanical report, only date seeds (Israel, Nahlieli, and Ben Michael 1995:3*; Kislev 1995).

9. But see contra Philip 2003:106 and bibliography therein. According to Philip the best evidence for the use of dams is not in the best cultivated areas but in the arid eastern Jordan (e.g. Jawa), an area which in any case is far beyond the focus of this research.

8

Faunal Commodities

1. Zoology and Archaeology

Archaeofaunas are one of the most important components of the archaeological record that can be utilized in the reconstruction of the economic life of ancient settlements and their hinterland. EB faunal remains of the southern Levant have been closely studied, thanks to the research of several scholars. For example, faunal evidence indicates that sheep were raised for their secondary products that could be traded or exchanged, reflecting a shift from subsistence to a 'market' economy (Grigson 1995:251). This is supported by texts from Syria and Mesopotamia from the fourth and third millennia BC (Heltzer 1976; Limet 1979; Pettinato 1981; Mudar 1982; Pinnock 1985; Zeder 1991; Steinkeller 1992) which record the movement of animals and agricultural products from the countryside to urban centers. However, the subject of reconstructing exchange patterns from the faunal assemblages, aside from special items such as marine shells, faces several methodological problems based on the interpretation of statistics (cf. Grayson 1979; Wapnish and Hesse 1988; Hesse and Wapnish 2001). Consequently, in this volume, we have chosen to narrow the focus of our subject, since we do not consider ourselves in a position to find an answer to these problems on the basis of the present data. Furthermore, the subject of donkeys will be treated in relation to the transportation and ritual aspect of these burden beasts and not as commodities (see Chapter 10). We will present here two sections in the study of exchange items within the field of archeozoological data where more or less secure statements can be made: marine shells and fish, and objects made of hippopotamus ivory.

2. Species and Commodities

A. Mollusca and Fish

The circulation and utilization of marine shells in the southern Levant is documented from the Upper Paleolithic and Epipaleolithic times onwards (Goring-Morris 1989; Reese 1991; Bar-Yosef Mayer 1999a). During the last century, the exchange of shells was one of the issues studied by anthropologists who researched exchange and gift giving systems (Bar-Yosef Mayer 1999a:7–17; Trubitt 2003). The work of Malinowski (1919, 1922) on the Kula system of gift-giving in the Trobriand Islands[1] is probably the best known study on this subject.

Shells have been used and exchanged for marriage ceremonies (Kenoyer 1997:275), decoration of the body expressing social status (Harding 1961), as a means of payment (La Pena 1978:330), in funeral and cultic ceremonies. (Safer and Gil 1982:173; Burger 1984; Reese 1989, 1990), for the production of color and lime (Bimson 1980; Reese 1979–80, 1987) and simply for the purpose of consumption (Meehan 1982). Sometimes a complicated network of exchange was developed, as was the case of the exchange of the *Spondylus* shell of the Gulf of Guayaquil, Ecuador, that was traded over hundreds and even thousands of kilometers by sea and land routes during the period of the Spanish conquest by a sort of merchants' league or guild called *liga de mercaderes* (Murra 1997:741–4).

Fortunately, we have significant database from archaeological excavations in the southern Levant on shells. On the other hand, there are few published works on the exchange of fish (e.g. Reese, Mienis and Woodward 1986), mainly because there is limited data on fish from archaeological sites in the southern Levant in general, the main reason for this being the methods of excavations which preclude sieving with a fine mesh (cf. Colley 1990). In addition, there are many methodological problems with the identification of fish remains that must be considered. Most importantly is the fact that some species are found both in the Mediterranean and Red Sea. Furthermore, due to the fact that fish bones are sometimes not well preserved, it is difficult to arrive at a clear identification of family, genus and species, such that a great degree of uncertainty exists in the identification of many remains of marine fauna (and see Lernau 2004).

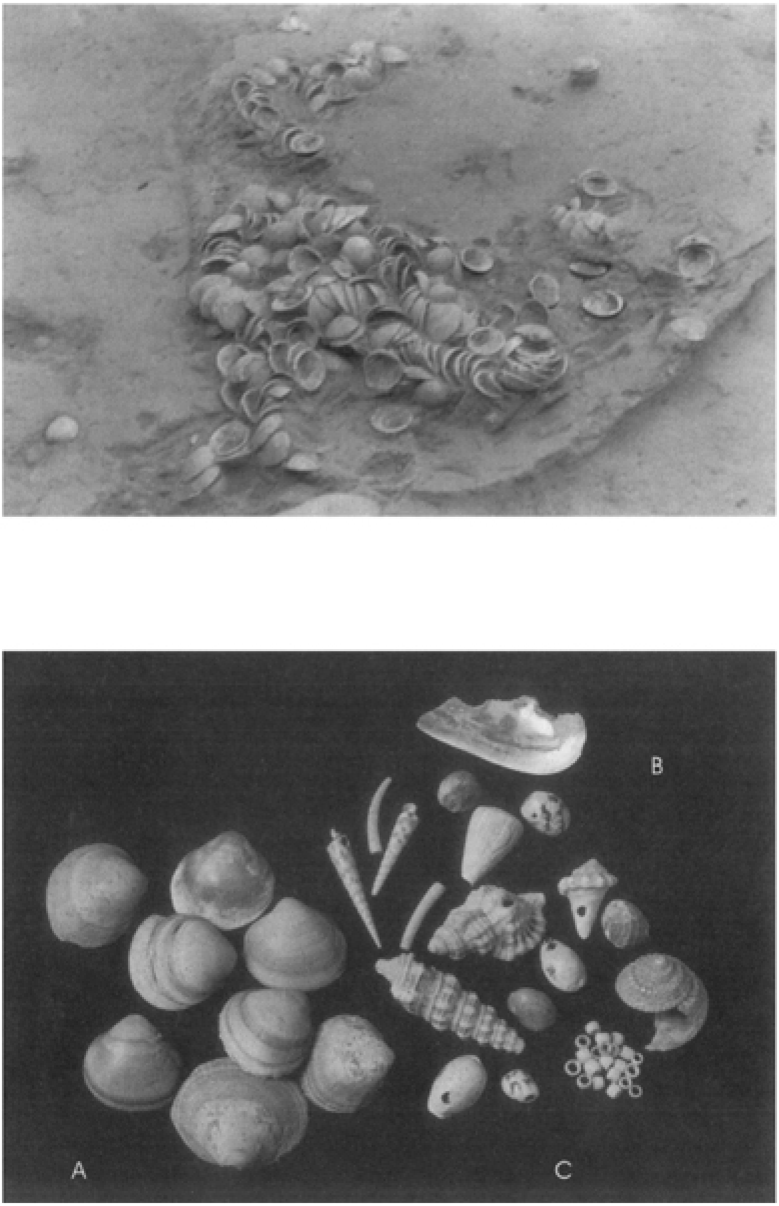
Distribution

In this section we will present the distribution of shells and fish from the Mediterranean (e.g. Figure 8.1: 1, 2.A) and the Red Sea (e.g. Figure 8.1:2.C) (Table 8.1 and Figure 8.2). In addition, we will also present the Nilotic *Chambardia rubens acuata* (formerly *Aspatharia* or *Spathopsis rubens* (Mienis 2004) (Figure 8.1:2.B), because we believe that the exchange of these mother-of-pearl shells exceeded regular trade with Egypt and became a commodity

integrated into the internal southern Levantine circulation of luxury items. Differently from other chapters we follow here a detailed discussion of mollusca and fish remains according to regions and contexts because of the great number of species and the complexity of the subject.

Galilee

In the Hullah Valley, two unidentified fish bones were found in the EB II stratum at Tel Dan (Wapnish and Hesse 1991:14, Table 4). At Tel Gadot, *Cypraea* sp.—a cowrie shell originating in the Mediterranean or the Red Sea—was found in a tomb dated to the EB. Further to the west, at Kabri (Area B), 47 fragments belonging to 9 taxa of molluscs were ascribed to the EB strata (Mienis 2002:404). While most of the taxa at this site originated in the Mediterranean, one fragment of *Chambardia rubens* originated from the Nile. However, no stratigraphic attributions for each specimen are given in the report. Kabri has also produced fish bones belonging to the Serranidae, Mugilidae and Moronidae families (Lernau 2002:Table 13.3). Unfortunately, aside from one vertebra of a Mugilidae that appears in Tomb 1105 (EB IA), there are no stratigraphie attribution to these bones. All three families are found along the Mediterranean coast (*idem*, 411–12, 415–16). A total of 350 marine shells were found at Qiryat Ata in EB IB and II contexts, among them 182 *Glycymeris insubrica*[2]; 89 were found near a basalt tournette in an EB II context (Reese 2003). Other Mediterranean shells found in EB II contexts are *Cerastodermata edule glaucum, Donax trunculus, Patella caerulea, Murex trunculus, Murex brandaris, Conus mediterraneus, Phalium* (helmet shells) and a *Lambis/Stombus*. *Glycymeris* and *Cerastodermata* were also found in some EB IB contexts in Area A. Most of the examples from these contexts were perforated, probably to be used as ornaments. The only species reported from the Red Sea is *Tonna* sp, found in EB II contexts (*idem*).



1

2

Figure 8.1 Shells, from Lod and Arad. 1. Shells (*Glycemeris* sp.) from Lod in situ (courtesy E. Yannai and O. Marder, IAA). 2. Shells from Arad. A. *Glycemeris* sp. (Mediterranean sea). B. *Chambardia* (Nile River). C. Shells from the Red Sea (after Amiran and Ilan 1993:Abb. 45)

Table 8.1 Mollusca according to their provenance and period.

Provenance		*Mediterranean Sea*					*Red Sea*					*Nile River*	
Sites	*IA*	*IB*	*II*	*III*	*I–III*	*IA*	*IB*	*II*	*III*	*I–III*	*IA*	*IB*	*II*
T. Gadot								+					
Kabri		+	+									+	
Q. Ata		+	+					+					
Yiftahel	+												
T. Qashish		+	+	+				+					
Megiddo		+					+					+	
T. Taanakh			+										+
A. al-Kharaz			+										
T. es-Saidyeh									+?				
Jericho		+	+	+			+	+	+				
T. Farah (N)		+										+	
Ai		+	+										
Jerusalem		+					+						
Atlit bay											+		
E. Assawir												+	
Givataym		+					+						
Tel Aviv							+						
Lod		+	+				?	?				+	+
Azor	+	+				+	+				+	+	
Palmahim		+										+	
Afridar	?					+					+		
H. Illin												+	
T. Yarmuth				+					+				
Lachish				?						+			
H. Ptora	+	+									+	+	
T. Erani												+	
T. el-Hesi				+									
E. Besor												+	
Site H											+		
T. Ikhbene	+	+									+?	+?	
T. es-Sakan		+											
T.Halif		+					+						
Arad		+	+					+				+	+
R. Nafha 396								+					
B. Uvda								+					
B. edh-Dhra			+?	+?		+		+?	+?		+*		
W. Fidan 4	+					+							

Note: Roman numbers relate to periods within the EB, I = EB I, II = EB II, and III = EB III. Sites without a specific period within the EB are labeled I–III.

Table 8.2 Fish remains according to periods. Roman numbers relate to periods within the EB, I = EB I, II = EB II, and III = EB III. Sites with (*) denote unidentified species.

Provenance	Mediterranean Sea				Nile River				References
Sites	*IA*	*IB*	*II*	*III*	*IA*	*IB*	*II*	*III*	
T. Dan*									
Kabri	+								
T.Qashish		+	+						
Megiddo		+		+					
T.Dalit*									
Azor	+								
T. el-Hesi				+					
T.Halif		+		+					
Afridar	+				+				

On the shores of the Sea of Galilee, *Clarias* bones were found in Tel Kinrot (Ziegler and Boessneck 1990). This fish could have its origin in the Nile or from local coastal rivers, as suggested by Lernau (1986/7).

Jezreel Valley

At Yiftahel a relatively large number of marine shells were found in Strata II (EB I), and in mixed fills (Bar-Yosef Mayer 1997b). Most of the shells from the EB I are derived from L60, which has been identified as a courtyard or utility area in an open space. They belong to two main species: *Glycymeris insubrica* and *Acanthocardia tuberculata* (*idem*, Table 23.1), with some of them bearing perforations.

A similar range of species was recovered from the EB I and EB II–II strata at Tel Qashish (Bar-Yosef Mayer 2003). Specimens of *Conus mediterranem, Cerastoderma glaucum, Dona trunculus*, were also found, all deriving from the Mediterranean Sea. Interestingly, one fragment of *Tonna* sp. found in an EB II context, is derived from the Red Sea (*idem*, 420). At this site, small bones from a flat-headed gray mullet (*Mugil cephalus*) dating to the EB I were identified, and a sea bream (*Sparus aurata*) from an EB II context. These species both originate in the Mediterranean Sea (Lernau 2003).

At Megiddo three shells from the EB IB strata represent examples of long-distance trade. One is a Red Sea *Dentalium* sp. bead.[3] Another Red Sea shell is represented by two fragments of *Pinctada margaritifera*, a mother-of-pearl. The third is a fragment of *Chambardia rubens* from the Nile River (Bar-Yosef Mayer 2000:480–1, Table 16.1). Fish remains were also found of species probably originated in the Mediterranean (Lernau 2000). *Chambardia rubens* is known also from Tel Taanakh (EB II?) (Ezzughayyar and Al-Zawahra 1996). At this site, remains of *Epinephelus* fish were also identified, probably from the Mediterranean Sea (Al-Zawahra 1999).

Jordan Valley

In the Jordan Valley, the excavations at Tel es-Saidiyeh (Tubb 1988) have produced (for the seasons of 1985–87) two ground-down and perforated *Nerita*, a perforated *Engina*, and two *Conus annulus*, the last three from burials (Reese 1991:161). All these shells originate in the Red Sea, and probably date to the

EB III.[4] At Tel Abu al-Kharaz, several species of *Nassarius* were found in the main phase of the EB II occupation in the site, among them *N. circumcinctus* and *N. gibbosulus* (Fischer 1993:P1. III:1). All these species come from the Mediterranean Sea.[5] All specimens are perforated and described as belonging to a necklace strung together with other beads (Fischer 1993:285).

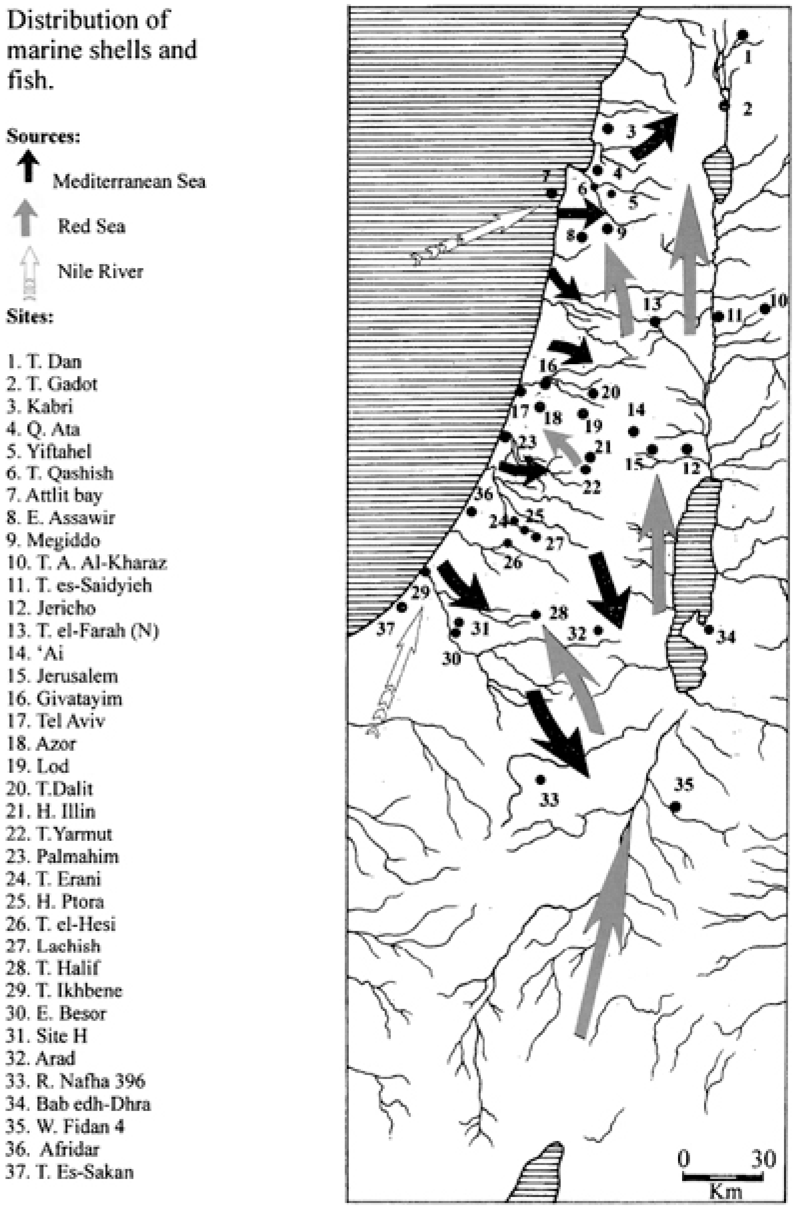


Figure 8.2 Distribution map of shells and fish during the EB I–III.

Jericho has probably produced the most varied range of marine shells in relation to other EB I to III sites. From the Mediterranean, dozens of *Glycymerys insubrica* and *Cerastoderma glaucum* are represented (Biggs 1960:386; 1963:125).[6] Most of them are perforated, part were found in caches, and reconstructed by Biggs (1963:Fig. 1a, b) as necklaces. In addition, there is a worn and perforated *Murex trunculus* (?), and a perforated *Murex haestoma*. Three *Donax trunculus* were also found, some of them showing signs of chipping on the edge. Red Sea species represented are two *Nerita* sp., perforated at the beginning of the whorl, six *Murex anguliferus*, one fragment each of *Cypraea turdus*, a *Cypraea erosa* lip, a *Conus arenatus* with a broken apex, a perforated example of *Conus taeniatus*, and *Terebra* (Biggs 1963:126–7; Reese 1991:164). A specimen of *Cypraea* from the Mediterranean or the Red Sea was found in Tomb A 127, and dated to the EB II (Kenyon 1960:Fig. 28:3; Reese, *idem*). One of the *Nerita* was found in Tomb A 94 and dated to EB IB, the second one was retrieved from Tomb F 3, and dated to EB III (Kenyon 1981:Fig. 55:1E). A trapezoidal-shaped pendant made of a shell (no species is noted) was found in Tomb F4 (EB III; Kenyon 1960:146, Fig. 48:4).

Central Hill Country

In the Central Hill Country, at Tel el-Farah (N), in Tombs 5 and 14, dated to the EB IB, five shell bracelets of *Cypraea monata*, one necklace composed of dozens of *Glycymeris* sp. and one worn *Phallium granulatum undulatum*, all coming from the Mediterranean Sea, were found (de Vaux and Stève 1949:126, Pl. VIb:1–3, 6–7; de Vaux 1952:582, Pl.XVII:1–2; Reese 1989:37). Furthermore, seven fragments of *Asphataria rubens*, many of them perforated originating in the Nile River were found in EB IB Tombs 9, 11–13 (de Vaux and Stève 1949:126, Pl. VIb:4–5; de Vaux 1951:572–87, Pls. XXVIa:3,b:17, XXVIIb:1; 1952:577, Pl. XVIIb:3, 8)

A cache of shells, identified as *Cerastoderma glaucum*, was found at ‘Ai Area C VII (Callaway 1980:125, Fig. 85). The cache consists of 19 perforated pieces from Phase V, i.e. EB II, and must belong to a necklace. Another perforated shell, identified as *Glycymeris glycymeris*, was found in the sanctuary in Area AII (Callaway 1972:Fig. 33:31, Pl. XVIII:2). It belongs to Phase III, dated to the terminal phase of EB I. Both species come from the Mediterranean Sea.

At Jerusalem (City of David), two molluscs were reported from EB I Stratum 20.[7] One is a small fragment of a pendant made from *Conus textile neovicarius*; it was found in Floor 2612. This species originates in the Red Sea (Mienis 1992:124). The second is represented by three shells found on Floor 2167, and identified as *Glycymeris insubrica* (one has a perforated umbo). This is the dominant bivalve on the shores of the Mediterranean Sea, representing a 85% of the *Glycymeris* sp. *Glycymeris glycymeris* represents only a 15% of the species (Mienis 1992:125–6; pers. comm).

Coastal Plain

A jar dated to the Canaanite EB IA, originating in Egypt but with some hybrid characteristics, was found submerged off the coast of Atlit, in the lee of the northern ridge of the cape (Galili *et al.* 2002). In this jar numerous *Chambardia rubens* shells were found, most of them complete and with their periostracum, a dark organic layer covering the shells, still intact (*idem*, 161, Fig.4). The shells were carbon dated to (calibrated) 3720–3380 BC. This example, together with the numerous fresh water mussels (*Unio*) found at Tel Qashish (Bar-Yosef Mayer 2003), are the only definite evidence for consumption of shells in the EB. *Chambardia rubens* was also found at En Assawir, in the Wadi Ara (Bar-Yosef Mayer 2002:130–1).

At Givatayim, perforated shells were found in Tomb 4, dated to the EB IB. Among them, are two *Nerita sanguinolenta*, originating in the Red Sea, and two *Cypraea* sp. originating in the Mediterranean or Red Sea (Sussman and Ben-Arieh 1966:Pl. VIII:4). Recent excavations in Tel Aviv (Kaplan Junction) revealed specimens of *Cypraea* sp. in caves dated to the EB IB (E. van den Brink, pers.comm.).

At Azor, a relative large number of shells was found in a small excavation conducted by Golani and van den Brink (1999), dated to the EB IA. Most of the shells originated in the Mediterranean Sea, while some came from the Red Sea and the Nile River (Bar-Yosef Mayer 1999c). Among those originating in the Mediterranean are *Glycymeris insubrica* (*idem*, Fig. 18:3–4), and *Donax trunculus*. From the Red Sea, a fragment of a bracelet made from *Lambis truncata* was found (*idem*, Fig, 18:1). This bracelet is of the 'Canaanite' type of bracelets cut from the body of the shell; hundreds of parallels to these bracelets were found in the nawamis at Southern Sinai (Bar-Yosef Mayer 2002:131–3).[8] *Chambardia rubens* is a Nile shell (*idem*, Fig. 18:5). From the EB IB a broken shell of *Chambardia* was found in Tomb 4 excavated by Ben-Tor at the same site (Ben-Tor 1975a:28, Pl. 24:3; Reese, Mienis and Woodward 1986: 80), while some 20 beads from Tombs 1 and 4 are made of small pierced shells (*Dentalium* sp.?; Ben-Tor 1975a:23, Fig. 12:20–22). A bone of *Epinephalus* sp. (Serranidae), was found during the excavations of Golani and van den Brink (1999) (EB IA) and originates from the Mediterranean Sea (Horwitz 1999:36).

In the Ayalon-Lod Valley, one fish bone was found at Tel Dalit in Area B, Stratum IIa (EB II), but no species is given (Horwitz, Hellwing and Tchernov 1996:196, Tables 2-3, Fig. 3). In the 2000 excavation season at Lod (Yannai and Marder 2001), several shells were retrieved from what appears to be the terminal phase of the EB IB and the EB II. The shells were identified by D. Bar-Yosef Mayer (pers. comm.) as *Chambardia rubens, Nerita* sp., *Glycymeris insubrica, Conus* sp. and *Cerastoderma glaucum*, all of them from the Mediterranean Sea, though the *Conus* could also be from the Red Sea. A perforated piece of *Cerastoderma* (probably a pendant) was found in Area C. In Area A2 a cache of *Glycymeris insubrica* was found containing dozens of shells; it is dated to EB IB (Figure 8.1:1).

Hundreds of *Glycymeris* sp. were found at Palmahim, and were associated with round installations in Stratum I (EB IB; pers. observ.). *Chambardia* sp. was also encountered at this site in Stratum I (Bar-Yosef Mayer, in press). Several *Glycymeris insubrica* were found at Lachish (Bar-Yosef Mayer 2004:2493).

Further to the south at Afridar, *Chambardia rubens* was found together with other shell species in Area G (Braun and Gophna 2004:219).[9] Fish remains from Areas E, F and G (Lernau 2004) provide information about five families, four from the Mediterranean Sea (Serranidae, Sparidae, Sciaenidae and Elastomobranchi) and one (Centopomidae), a *Lates niloticus* (Nile perch), that originated in the Nile River.[10] These bones must be dated in general to the EB IA, although there is a possibility that in Area E and F some of them appear in mixed Chalcolithic-EB IA contexts. According to Lernau (*idem*, 301–2) there are several indications that the fish remains of Area E were processed by drying, salting or smoking. In this area fish bones represent 8% of all animal bones; moreover, the state of preservation of the bones is much better here than in other areas of the site.

Chambardia was found as well at En Besor (Reese, Mienis and Woodward 1986, Bar-Yosef Mayer 2000:481, Horwitz *et al.* 2002:118–20). At this site a serrated tool made of *Chambardia rubens* was identified as a fish scaler. Similar objects were reported by Macdonald (1932:P1. XXIII:33,35) from his excavations at Nahal Besor (Site H).

Next to the coastal shores and the junction with Nahal Besor, Taur Ikhbene (EB IA and IB) produced 31 shells of Mediterranean origin in addition to one *Chambardia rubens* (Horwitz *et al.* 2002:116–17, Table 6). The EB IB strata at Tel es-Sakan yielded Mediterranean taxa such as *Glycymeris* sp., *Ostrea edulis, Cerastoderma glaucum, Donax trunculus* and *Nassarius circumcintus* and Chambardia sp. (de Miroschedji *et al.* 2001:90).

Shephelah

At Lower Horvat Illin near Bet Shemesh (Braun and Milevski 1993; Milevski 1993), several fragments of *Chambardia rubens* were found. A few kilometers to the south, Tel Yarmuth yielded the following molluscs in the excavations by Ben-Tor (1975b:73): *Cytracea, Glycimeris, Cerastoderma glaucum, Cardium tuberculatum* and *Natica* sp., all of them from the Mediterranean Sea. Only one shell, *Nerita* sp., derives from the Red Sea. Fish vertebrae were also found, but no specification about species is reported. The excavator related these finds to the EB III.

Tufnell *et al.* (1958:323–4) reported several EB shells from the NW caves and the NE section at Lachish. Almost all originated in the Red Sea (e.g. *Planaxis, Nerita* and *Ancilla ovalis*), while one Mediterranean species, *Pectunculus* sp. was found in the NE section. A single *Nassa circumcinta*, found in one of the caves, could come from either the Mediterranean or the Red Sea. None of these finds has a clear chronological attribution within the EB.

A recent salvage excavation near the western part of Horvat Ptora produced

several fragments of *Chambardia* sp. from EB I layers (pers. observ.), as did Tel Erani (Bar-Yosef Mayer 2002).

Further to the south, Tel el-Hesi yielded some fish bones and sea shells. They are described as originating in the Mediterranean but no specific species are given (O'Connell 1978:89; Toombs 1983:44).

Northern Negev

At the Halif terrace ('Silo site') examples of *Glycymeris* sp and *Cardium* sp. were found in Stratum II, dated to late EB IB, as well as a shell of *Strombus* sp. (Alon and Yekutieli 1995:181, Fig. 28:1). The former two originated in the Mediterranean Sea, while the latter comes from the Red Sea. The report by Zeder (1990:27–8, Table 8), mentioned also fish from the EB IB and EB III strata but these remains were scarce. They probably originate in the Mediterranean.

At Arad several *Glycymeris insubrica* (Figure 8.1:2.A) and fragments of *Chambardia rubens* were found in EB IB and II strata (Reese, Mienis and Woodward 1986:82; Bar-Yosef Mayer 2002) (Figure 8.1:2.B). A juglet was found *in situ* together with a pendant and several beads made of mother of pearl (Amiran *et al.* 1978:Pl. 119). A *Terebra* shell (Bar-Yosef Mayer 1999a) was found also at Arad (Amiran *et al.* 1978:Pls. 68:19, 118:11, 13) together with other Red Sea species (Figure 8.1:2.C). Another specimen of *Terebra* shell was found in an EB II locus[11] at Rekhes Nafha 396, north of the Ramon Crater in the Negev hills (Saidel 2002:57, Fig. 14:12).

Dead Sea Plain and Aravah

Tomb A76A at Bab edh-Dhra has produced a shell bracelet made from *Lambis truncata sabae* (Schaub and Rast 1989:310–12, Fig. 183). This shell originated in the Red Sea and is dated to EB IA. From Charnel House A 21 at this site (EB II–III), there are several exemplars of *Ancilla* sp. (*idem*, 463–4, Fig. 266, 2nd and 3rd rows) that originate from the Red Sea, as well as *Glycymeris insubrica* and *Glycymeris* sp. (*idem*, 3rd and 4th rows). Dozens of *Conus* shells were found in Charnel houses A 21 and A 51 (e.g. *idem*, 467–8, Figs. 266, 3rd row; 269, 1st row; 270) and could derive either from the Mediterranean or the Red Sea. Some of the *Conus* were polished at both ends. Hundreds of shell beads were also found in the tombs. Charnel House A 8 contained a trapezoid made of mother-of-pearl from the Red Sea, probably *Pinctada margaritifera* (Schaub and Rast 1989:456, Fig. 262:1).

Another large assemblage of shells was found in the EB IA site of Wadi Fidan 4. It includes 317 molluscs from 13 different species, comprising marine, fresh water and land varieties (Adams and Genz 1995:16, Fig. 7:9–10; Adams 1999: Fig. 5.27). Of these, five species of marine shells were used for ornamentation, including bracelets and pendants/beads. These included *Glycymeris insubrica* (7) and *Cypraea spurca* (1) from the Mediterranean and *Lambis truncata* (5), *Nerita*

polita (2), *Pteria* sp. or possibly *Pinctada* sp. (2), from the Red Sea. The fragments made from *Lambis truncata* were found as five pieces of a shell bracelet (Adams 1999:Fig. 5.27:5–9), and five of the *Glycymeris* shells had been perforated, possibly for use as pendants/beads (*idem*, Fig. 5.27: 1-4).

Further to the south, at Biqat Uvda, shells of 31 different species originating in the Red Sea were found in Site 911 (Mienis 1990). The site contains a mixed assemblage of EB II and IBA pottery (Reich 1990). It is probable that part of the shell sample belongs to the EB II occupation period of the site. Among the species represented are *Nerita, Strombus, Morula, Conus* and *Glycymeris arabica* (*idem*, Table 1). In addition one bead made of a *Dentalium elephantium* (Beit-Arieh 2001:Fig. 4:30.) was encountered in an EB II context at Site 917. The shell most probably originates in the Red Sea.

Discussion

It is suggested here that marine shells found in sites located far from the Mediterranean and Red Seas were collected as a product: (1) direct collection of the shells, (2) exchange of the shells from the coast with local populations conducted by middlemen, (3) gift-giving by people from the coast in exchange for other gifts from people of the interior region, but not part of a whole system of gift-giving.

According to the distribution patterns (and see Figure 8.2) it does not seem plausible that a Kula-like system existed in EB Canaan. But even gift-giving ceremonies had the intention of advancing the economic interest of the populations, since without these ceremonies no economic trust could exist (Weiner 1992:131–48). Besides, even with the existence of the Kula institution, other forms of barter existed in the Tobriand Islands that included fish and other commodities. It seems possible that during the EB in the southern Levant, not all the shells had the same value and use, and for this reason different circulation patterns probably existed that are difficult to track in the archaeological record.

It is clear that *Murex* shells found at Qiryat Ata and Jericho could not be part of the exploitation of the species in purple-dye or lime production, since such industries need thousands of shells (cf. Reese 1979–80, 1987). It is more likely that in EB Canaan single *Murex* shells were worn as pendants, or used as containers or votive objects in tombs together with other exotic molluscs. Small bivalves and cockleshells such as the *Murex* could be used as containers for cosmetics as in the cases described by Kenoyer (1997) in the Indus Valley.[12]

Chambardia and *Pinctada margaritifera* mother-of-pearl shells may have been collected for aesthetic purposes. It seems that the exchange of *Chambardia* coincides with Egyptian influence, beginning with the EB IA and becoming fully developed in the EB IB. *Nassarius* and other species were utilized to make beads.

No debris from working these shells was found in EB sites as at Ebla, where

there appears to have been a workshop for the manufacture of shell and mother-of-pearl objects, among other special fine crafts (Akkermans and Schwartz 2003:271–2). Adams (1999:127) has pointed out that the fact that no debris of mother-of-pearl was found in Levantine sites, taken together with the non-local nature of the species, suggests that these items arrived as finished items. However it is more likely that these shells arrived as 'raw material.' *Chambardia* is a very soft shell and is probably best suited to be used as an inlay, although whole shells are often found rather than cut pieces. It is possible that they were consumed as in the case of the contents of the jar found off Atlit suggests.

Bar-Yosef Mayer (2002) suggested that the *Lambis truncata* bracelets that arrived in Canaan followed a Sinai route, up through the Negev and the Aravah. All the Red Sea species arrived through the Aravah Valley and were distributed to the west and north through the valleys and *wadis* running to the Mediterranean and the Jordan Valley. The other route originated in Lower Egypt and transportation was along the northern Sinai route which followed the Mediterranean coast. On the other hand, we have confirmation from some of the settlements of the coastal shores of Canaan that *Chambardia* may have arrived from Egypt via a maritime route. If there was also transportation along the northern Sinai route, it is interesting that it did not deviate southwards, since not a single fragment of *Chambardia* was found in the *nawamis*. There are, however, many artifacts made of *Pinctada margaritifera* which is also a Red Sea species. These primarily include a few hundred disk beads and other unique artifacts and pendants (Bar-Yosef Mayer 1999b).

Numerous shells exhibit perforations (whether natural or not) including numerous *Glycymeris* sp. examples. We suggest that the several cases where *Glycymeris* were found in caches of dozens and hundreds of items (e.g. Palmahim, Lod and Qiryat Ata) may be interpreted in two ways: either they were stored for future exchange, or else used in the fabrication of lime, as in the case described by Reese (1979–80). The fact that the cache of Qiryat Ata was found near a tournette for pottery fabrication could imply that *Glycymeris* (and other ?) shells were crushed to be mixed as temper into the clay of the vessels. Bar-Yosef Mayer (pers. comm) has also suggested that *Glycymeris* caches were used for floor make-up since they are lighter than stones and have a raised middle part so that water could drain off.

The Mediterranean shells arrived in the east of the country through the same valleys and *wadis* as the Red Sea species arrived to the Mediterranean coastal plain and the Shephelah. These shells reached the Hulah Valley in the north and Wadi Fidan in the eastern Aravah in the south.

Based on the outline of the chronological framework (cf. Table 8.1), it is apparent that the spatial distribution of shells changes during the course of EB II and EB III periods, when not only the Egyptian *Chambardia* almost disappear, but also the Mediterranean and Red Sea shells decrease in number. Jericho is the only site that may have been at the center of the network during the whole

EB, having species from the Mediterranean and the Red Sea, but not from Egyptian origins. It is possible that the *Chambardia* shells that arrived in the eastern Jordan Valley utilized a route that went across Tel el-Farah (N) and not the route going through the Shephelah and the Judean mountains down to Jericho. *Chambardia* did not reach the Southern Negev, the Dead Sea Plain or the Aravah. The southernmost site where this species was found is Arad. This is further proof of the existence of two separate circulation networks: Red Sea species on the one side and Nilotic species from the other (whether they arrived by terrestrial or maritime routes).

Fish remains are few and in some cases were not identified. Most of the species originated in the Mediterranean, with one case only of Nile perch. In general the sites where fish bones were found are near or on the shores of the Mediterranean. Tel el-Hesi and Tel Halif are at a distance of *ca.* 30 and 50 km respectively from the sea. While we have a limited amount of information, we can suggest that fish transported beyond a certain distance would have been processed before shipping, either by drying or smoking. From later periods we have abundant data on these processes as well as salting[13] (e.g. Curtis 1984; Desse-Berset and Desse 2000; Delussu and Wilkens 2000; de Grossi Mazzorin 2000). From the Akkadian dynasty and Ur III in Mesopotamia (fourth quarter of the 3rd millennium BC) we have descriptions and values of exchange for smoked fish (Zaccagnini 1976:555–7).[14]

It seems that species coming from Egypt must surely have been treated before they arrived in Canaan. As described by Lernau (2004), Afridar could have also been a locus of fish preparation.

B. Hippopotami and Ivory Objects

This section will deal with the remains of *Hippopotamus amphibius* and ivory objects, mainly bull heads made of hippopotamus teeth. It is assumed that hippopotamus was exploited in herds on the coastal plain where suitable conditions existed for these beasts, thousands of years after the earliest hippopotamus invaded the southern Levant from Africa during the Pliocene. This is documented in the archaeological records (Tchernov 1988; Horwitz and Tchernov 1990).[15] A last invasion of hippopotamus could have occurred during the maximum glacial period (*ca.* 18000 BP) with populations of hippopotami reported from northern Syria in the Orontes Valley (Horwitz and Tchernov, *idem*). In the southern Levant *H. amphibius* seems to have become extinct by the Iron Age (Tchernov 1988).

Although ivory finds from the EB are rare, in contrast to the previous Chalcolithic period (e.g. Perrot 1959; Bar-Adon 1980:16–23, 152; Barnett 1982:23–4), the production and exchange of these objects during the EB II–III has been the object of several studies (e.g. Ben-Tor 1968:125–7; de Miroschedji 1993; Beck 1995:21–5) (Figure 8.3). We have to bear in mind that ivory objects in the southern Levant were made of hippopotamus teeth (e.g. Caubet and

Poplin 1987, 1992, 1995). The advantage of hippopotamus teeth over the elephant tusks is that they retain their whiteness over time. In addition, hippopotamus tusks are also smaller in size and are locally available in contrast to the elephant which was already extinct in this region by the EB (Horwitz and Tchernov 1990:67).

In light of new faunal data that we will present in the following section, and the distribution of the ivory bull heads, it seems that we have to expand the habitat areas of the hippopotami in Canaan to the Jordan Valley during the EB.

Hippopotamus remains

Several excavations have yielded bone remains of *H. amphibius*. Some finds were ascribed to the EB even though they are not dated with certainty (Table 8.3).

The northernmost appearance of *H. amphibius* is at Bet Yerah (Greenberg *et al.* 2006). Long bones and two canines were found in a context tentatively dated to EB II or III (L.K. Horwitz, pers. comm.). Close to this site, hippopotamus remains were found on the shores of the Sea of Galilee, near the beach of Kibbutz Ginossar (R. Rabinovich, pers. comm.). These remains prove that the lake was once the habitat of hippopotamus.

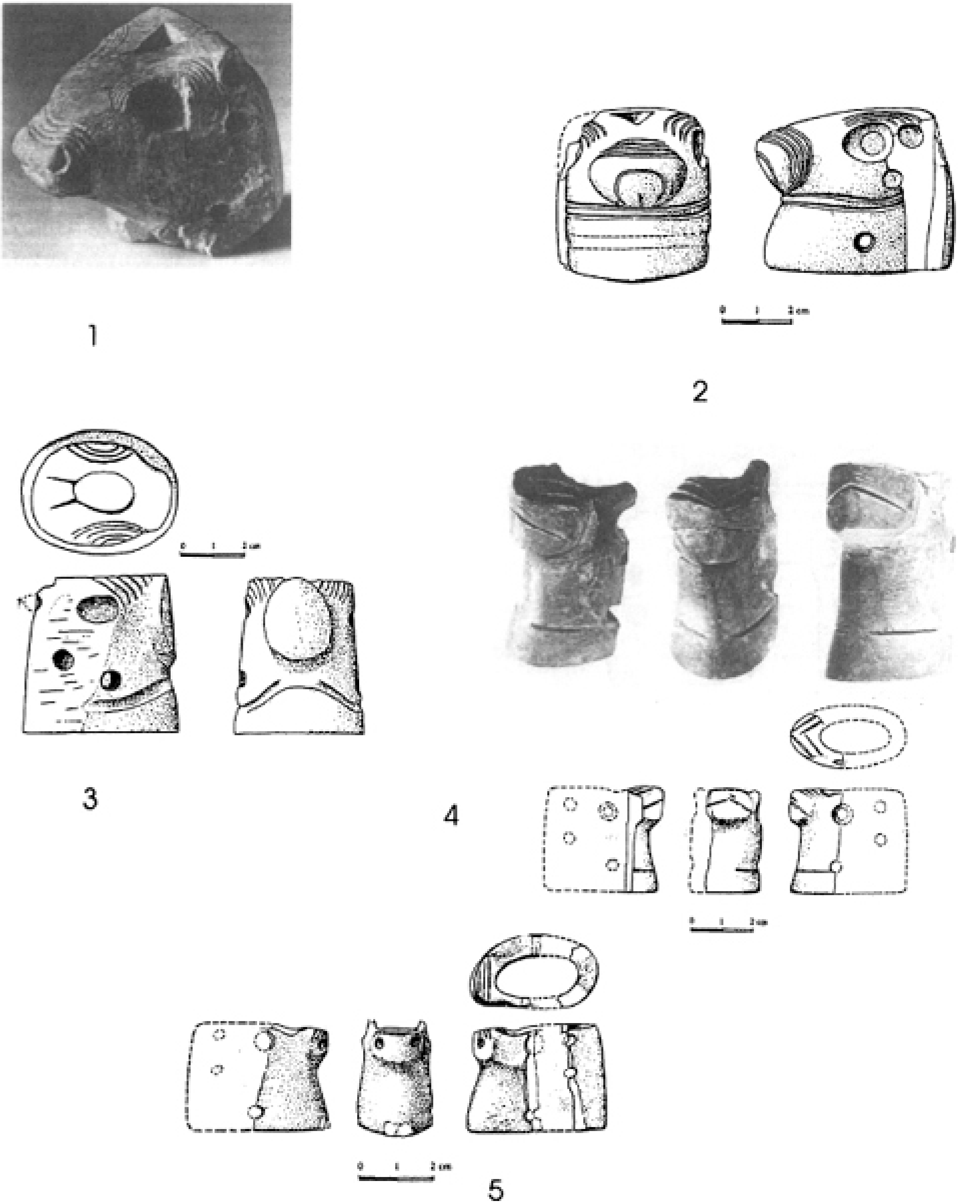


Figure 8.3 Ivory and bone bull heads. 1. Bet Yerah (after de Miroschedji 1993 :Fig. 6). 2. Jericho (after de Miroschedji 1996:Fig. 4). 3. Bab edh-Dhra (after Wilkinson 1989b:Fig. 262:2). 4. Arad (after de Miroschedji 1993:Fig. 2). 5. Tel Yarmuth (after de Miroschedji 1993:Fig. 1).

Table 8.3 Hippopotamus faunal remains according to sites.

Site	EB III
Bet Yerah	
Kinneret*	

N.Hataninim*
Yarkon River*
T. Aphek
T. Dalit
'Ai
T.A? al-Kharaz
Jericho
T. el-Hesi*
Arad

Note: * indicates that the date of the remains are not sure.

Other surface finds of *H. amphibius* from Nahal Hataninim and the Yarkon River in the Central Coastal Plain (Horwitz and Tchernov 1990:Fig. 4 quoting Bytinski-Salz 1965). A metapodial bone from an EB II context belonging to a hippopotamus was reported at Tel Aphek also, in the Yarkon River basin, (Hellwing and Gophna 1984: Table 2, Hellwing 2000:305–6, Table 15.19). Further to the southwest, two bones (a metacarpal and a phalanx) were recovered from Tel Dalit in Area B. These bones were found in a broadroom in Stratum II (EB II; Horwitz Hellwing and Tchernov 1996:197, Table 2, Fig. 3). At Gezer some hippo remains were reported but no dates were given (Horwitz and Tchernov 1990:71–2). In the Central Hill Country, a tusk was retrieved at Ai from a fill outside the east wall of Building C in Phase III, which is dated to EB II (EB IC in the terminology of the excavator). The exact date of the tusk remains uncertain. It was identified by I. Cornwall as a lower right canine (Callaway 1972:112–13, Pl. XII: 1).

In the eastern Jordan Valley, hippopotamus tusks have been reported by P. Croft from Tel Abu al-Kharaz, *ca.* 4 km east of the river, but is not clear from the report (Fischer 1997:160) if they belong to the EB levels. However on the basis of the presence of a cylinder seal or a necklace bead made of hippopotamus ivory and dated to the EB II/III (Fischer and Herrmann 1995; Fischer 2002:330, Fig. 21.3:1), it is suggested that the hippopotamus remains are part of the EB assemblage at the site.

Further to the southwest, the recent excavations of the Italian-Palestinian team at Jericho produced some remains of a hippopotamus. Several fragments of a calcaneum and fragments of other long bone were found in a residential area of EB III (Alhaique 2000:298, Table l).[16]

In the Shephelah, Horwitz and Tchernov (1990:71–2) document remains from Yeivin's (1961, 1977a) excavations at Tel Erani supposedly dated to EB, and they report undated remains of hippopotamus from Tel el-Hesi that eventually could have derived from the EB III occupation period of the site.

Finally, at Arad two lower incisor fragments of *H. amphibius* were found in Stratum II, i.e. EB II (Davis 1976:163).

Bull's Heads from Ivory and other materials

Besides the hippopotamus faunal remains, several carved objects made of hippopotamus teeth were found in EB II–III contexts. They represent a bull's head with carved round eyes with incision lines above them, lateral perforations depicting the ears, and holes in the base of the neck. Some of them have a perforation for the horns. It is assumed that eyes and horns were inserted into the holes. A triangle was engraved on the forehead and the neck, which is hollow and exhibits skin-folds in the middle of it (Figure 8.3:1–5). In addition, similar objects made of bone (e.g. Figure 8.3:6) and stone were found. The distribution of these heads reveals the following (Table 8.4, Figure 8.4):

Table 8.4 Bull's heads from ivory and other materials according to sites. Types correspond to de Miroschedji 1993:Table 1.

Sites	*Type*	*Material*	*EB II*	*EB II/III*	*EB III*
B. Yerah	1B	Ivory			+
'Ai	2	Ivory	+		
	1B	Ivory			+
Jericho	1B	Stone		+	
	1B	Ivory			+
T. Yarmuth	1A	Bone	+		
B. edh-Dhra	1B ?	Bone			+
Arad	1B	Ivory	+		

At Bet Yerah an ivory bull's head was recovered from the EB III stratum at the site (Bar-Adon 1962). The bull's head is 4.4 cm in height and 3.4 cm in width. It has holes for inlaid eyes, ears and horns.

At 'Ai two bull's heads (Ben-Tor 1972:24) were discovered, originated in Room 116 of Sanctuary A (Marquet-Krause's 1939:20–1, Pl. XCIV), dated to EB IIIA. The second was found in the excavations of Callaway (1980:123, Figs. 83, 91:21) in Phase V, dated to EB II.

Jericho has yielded two bull's heads as well. One (Figure 8.3:3), made of ivory, came from the Garstang excavations (Cleveland 1961). It is very similar to those from Bet Yerah and 'Ai (Sanctuary A) and dated to EB III. The second bull's head is made of stone, and was found in EB III tomb D 12 (Kenyon 1960:125–6, Fig. 40:2, Pl. VII:2) in Layer 1. It has a triangle of bone inlaid in the forehead, and it has holes for inlaid eyes, ears and horns.

At Tel Yarmuth a fragment of a bull's head made of bone was found in level B-IV, late EB II (de Miroschedji 1988:Pl. 48:1, XXIV:1). The upper part is missing, while it has holes for an inlaid nose, and incised parallel lines above the holes.

At Arad a similar fragment, also from the lower part of the head, was found in Locus 748, which was defined as belonging to stratum III or II, i.e. EB II. It is made of ivory and was defined by the excavator as 'a decorated ivory handle' (Amiran *et al.* 1978:Pl. 120:9). The incised lines of the nose can be seen, but no holes for inlay are present.

At Bab edh-Dhra (Wilkinson 1989b:456, Fig. 262:2) a bull's head made of bone was found in Charnel House A 21. It was found near a group of skeletal remains and dated to EB III.

Discussion

As has been observed (Beck 1995) the distribution of the bull's heads sculpted in ivory and other materials is concentrated in the Rift Valley and adjacent areas such as the Central Hill Country, the northwestern Negev and the Dead Sea Plain (and see Figure 8.4). This distribution is more understandable with the new data from the findings of hippopotamus remains in Bet Yerah, Tel Abu al-Kharaz and Jericho. Bone and stone were used instead of ivory due to the rarity of ivory in the country.

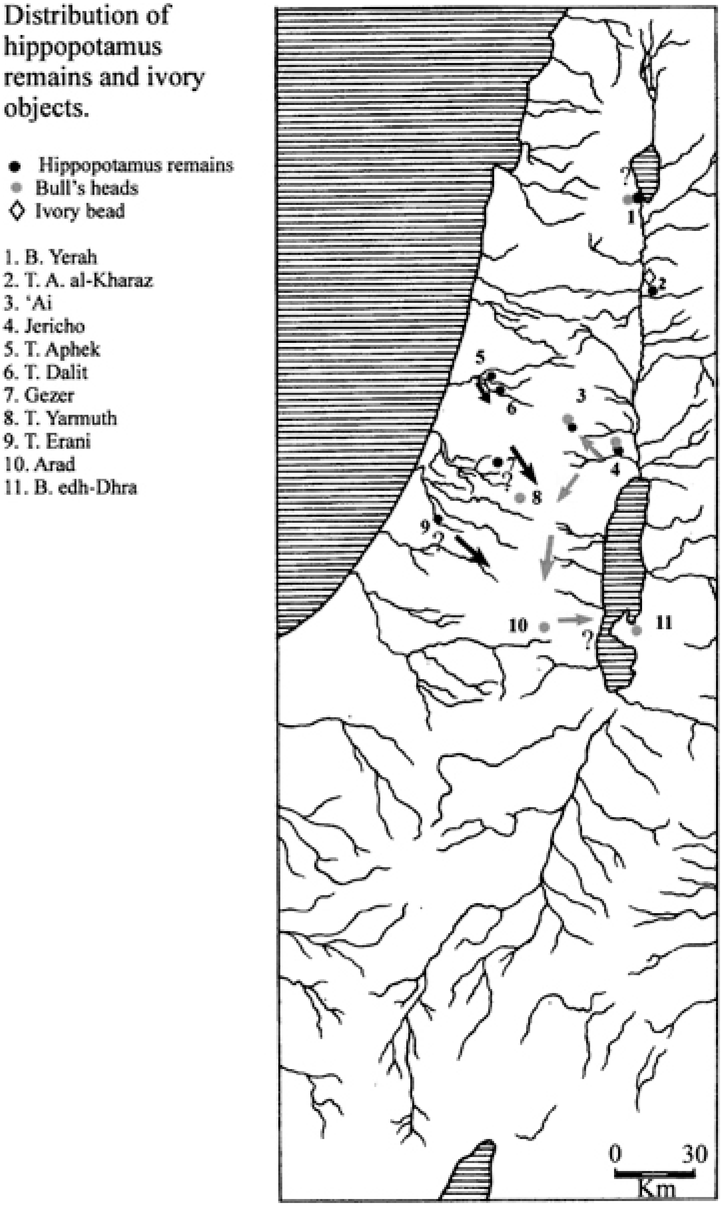


Figure 8.4 Distribution map of hippopotamus remains and ivory objects.

Until now the proposed habitat for these animals was the Mediterranean coast and perhaps the rivers of the Central Coastal Plain including Nahal Hataninim, the Yarkon River, Nahal Lachish and Nahal Shiqma. In this setting, it was clear that the tusks found at Arad and Ai were the result of exchange with the areas where the hippopotamus lived. The existence of faunal remains of hippopotamus other than teeth at Bet Yerah and Jericho suggests that at these places hippopotamus herds also existed. Alternatively, it is interesting to note that at both Jericho and Bet Yerah the finds are foot bones which could

have remained with a skin that was transported to these sites[17] or else the bones could have arrived as a luxury food item.

As was pointed out in Chapter 3, it was a change in the sphere of distribution of northern pottery in the Southern Jordan Valley and the Dead Sea area (e.g. Jericho, Bab edh-Dhra), that was expressed in the absence of MW in this area. This change in the distribution northern pottery reverts back in the following EB III. The distribution of ivory and bulls heads is consistent with the new situation in the EB III, although it begins in the EB II.

The phenomenon of the bulls heads in Canaan is a local one, even if reminiscent of a northern influence (cf. de Miroschedji 1993:38). Both from an iconographic point of view (Beck 1995:23) and the carving technique (Caubet and Poplin 1995:489), the Canaanite workshop(s) worked with a quite different approach from those of Syria and the region of the Euphrates, which manufactured other objects. We prefer to see in the bulls heads the result of several workshops rather than one (cf. Ben-Tor 1972) because the iconographic, chronological and raw material features of the different items are not exactly the same (cf. Table 8.4). It is clear that the hollow in the base of the heads facilitated the head to be fixed, most probably to a stick. It is most likely that the bull's heads were the upper part of a scepter (de Miroschedji 1988:87, 1993; Beck 1995:24), and not a decorative element of furniture—a chair for instance, as proposed by Garstang (1932:18)—since no pairs of these objects have been found. As the bull's heads were recovered mostly in cultic or burial contexts, it must be assumed that they were utilized in certain ceremonials or rituals. As Beck (1995:25) has pointed out, the figure of the bull has numerous identifications with deities in the Ancient Near East, and is associated with the royal authorities (cf. Oman 2001; Borowski 2002:407–8).[18] At Ugarit, for instance, the bull is the most frequently encountered animal appearing as the epithet for the gods El and Baal (Foster 2002:299, Borowski, *idem*).[19]

There are, however, several possibilities about the way in which the production and exchange of the bull's heads were conducted by the workshops. One possibility is that a number of workshops existed during the EB II and III in the Rift Valley, and that these workshops provided bull's heads for scepters for the authorities of the cities. This option includes the possibility that workshops existed near the hippopotamus herds or that tusks were acquired from hippopotamus hunters. The second option assumes that the central powers of the cities controlled the artisans or that these authorities 'imported' the tusks from distant sites, including those from the coastal plain, as in the case of 'Ai and Arad. A third possibility was pointed out by Barnett (1982:11) and de Miroschedji (1993:39); namely the existence of itinerant carvers who brought with them the raw material and did the work on demand. This possibility is also plausible, but less probable in the light of the recent findings of hippopotamus remains at Bet Yerah and Jericho.

Notes

1. The *Kula* ring was a special exchange system in the Trobriand Islands in the Pacific Ocean. Shells are part of this system of exchange or gift giving among various tribes of the islands. The exchange takes place between friends or relatives in order to maintain the relationship and gain power within the society. Mauss (1990), based on the work of Malinowski, developed the conception of 'the gift' as a special act in pre-capitalistic societies to pursue exchanges without an economic purpose. A similar system is registered among the Raiapu of New Guinea, that includes the *te* ceremony (Bus 1951; Waddell 1972:Fig. 2). One of the functions of this gift-giving ceremony is the distribution of locally scarce resources such as salt, tree oil, feathers, shells, cassowaries, drums and stone axes (Waddell 1972:107–8). In Botswana, Southern Africa, there is a Kula-like ceremony among the !Kung San called *hxaro* (Wiessner 1977).

2. Known previously as *Glycymeris violascens*. I owe this information to Henk K. Mienis to whom I am indebted.

3. Similar specimens were found in the *nawamis*, in southern Sinai (Bar-Yosef Mayer 1997a, 1999a).

4. Shells from later seasons are not been published yet (e.g. Tubb and Dorrell 1994:63).

5. The shells from Ai, Givatayim, Wadi Fidan 4, and part of those from Tel el-Farah (N) and Bab edh-Dhra were identified by Henk K. Mienis, to whom the author is indebted.

6. In the report by Biggs (1963:125), they are reported as *Cardium edule*, which is actually the Atlantic parallel of this species. I owe this information to Henk K. Mienis.

7. Unfortunately, no fish bones are reported for the EB.

8. According to observations made by Bar-Yosef Mayer (2002:132), bracelets of the Canaanite type were cut from the body of the large *Lambis truncata* and therefore have a somewhat triangular or twisted shape. Some of the sites in southern Sinai, like Wadi Watir VIII, contained the same type of bangles, together with bangles manufactured from the same mollusc but made in Egypt.

9. The collection of shells will be published by D. Bar-Yosef Mayer (pers.comm.).

10. It should be noted that until recently it was thought that *Lates niloticus* may have lived in the rivers of the southern Levant (Lernau 1986–87). For this reason DNA studies on the bones of this fish were recently carried out (Arndt *et al.* 2003). Their results prove that *Lates* derives only from Egypt.

11. The dating to the EB II is not certain since IBA (EB IV) remains are also present in the site.

12. In the Ur III period, these types of shells were used for cosmetics as well (Danti and Zettler 1998). White, green, blue yellow, red purple and dark brown/black pigments occur in the cockle shells, with green and black pigments being the most common. XRD and XRF techniques were used to determine the composition of the pigments found in those shells. The green material seems to be copper, the black kohl for the eyes (Bimson 1980:75–7).

13. It is generally accepted that the earliest forms of preserving fish were sun-drying and smoking, and that salting is a later method.

14. Other references to the acquirement of fish from Dilmun appear in the Summerian literature (Pettinato 1972:93), together with edible molluscs.

15. Cf. Martínez-Navarro 2004:43.

16. I thank Rivka Rabinovich and Liora K. Horwitz for referring me to this

information.

17. This is common for antelopes which often have the foot bone still attached to the skin in order to stretch the skin. I own this suggestion to Liora K. Horwitz.

18. Other representations of bulls are found on a stone statue at Arad, which finds a parallel with a bull's statue from Ebla (Amiran 1980b, 1986), and abundant clay figurines representing cows (e.g. Greenbeg 1996:Fig. 3.38:6–8; Yadin *et al.* 1989:Fig. 155:31–35; de Vaux 1952:Pl. XIV; Kenyon 1960:Fig. 40:1; Amiran *et al.* 1978:Pl. 117)

19. At Tel Brak, for instance, a human-headed bull was found in temple SS and is perhaps associated with the god Shamash (Oates and Oates 1991; Akkermans and Schwartz 2003:280, Fig. 8.27)

9

Minerals

Minerals as exchanged commodities, other than stones for flint and ground-stone tools, are presented in this chapter. The main mineral described here is bitumen, for which we have good information on its geological sources and archaeological find spots.

Carnelian is the second most important mineral. Unfortunately, the data here are restricted to finds; there is no clear proof of the sources that supplied the EB people with raw materials for beads. Other minerals are even less in evidence in the archaeological record.

Sulphur is reported in the preliminary reports from Tel el-Hesi (O'Connell 1978:89) but no analysis of the material was given, and it is suggested that it originated, as did bitumen, in the Dead Sea (Amar 1998). Ocher was reported from Tel Halif ('Silo site'; Alon and Yekutieli 1995:181). For all these materials we have no sufficient data.

Salt has been suggested as one of the raw material exchanged between the Dead Sea region and other parts of the country via Jericho (Anati 1962). However, there is no archaeological proof for such exchange.[1] Kahal (stibium) is registered in the known paintings of Beni Hasan (beginning of the Canaanean MB IIA) (Newbery 1893; Wilson 1955:229), and it probably originated in the Hermon mountains (Miron 1990), but no remains of this material have been registered from the EBI–III in Canaan.

1. Bitumen

A. Materials and Sources

Natural occurrences of bitumen are in two forms in the Dead Sea Basin: either

as massive blocks that can weigh several dozens of tons, and which occasionally float to the surface of the lake; or as veins and seepages within rocky outcrops in *wadis* draining into the south-west corner of the basin, between Mount Sedom to Massada (Nissenbaum 1978:838–9; Nissenbaum and Goldberg 1980:Fig.4). While the appearance of blocks in modern times is extremely sporadic, it is likely that they may have appeared much more frequently in antiquity (Nissenbaum, Aizenshtat and Goldberg 1980:157).

Collection of bitumen has been described by classical historians and geographers, such as Diodorus Siculus, Strabo, Josephus Flavius and Pliny (cf. Nissenbaum 1978), who refer to the material as an important trade commodity especially to Egypt. Reports of Dead Sea bitumen from the Middle Ages until recent times are scarce, but both the Persian traveler Nasir-I-Khausrau and the Crusader period monk Burchard of Sion mention its use and trade. Robinson (1841) and others (and see Nissenbaum 1978:841) reported the appearance of large quantities of bitumen on the surface of the Dead Sea in 1834 and 1837, when the local Jehalin Bedouins on both occasions sold some 3,000 kg of this material in Damascus.

Systematic studies of the chemical composition and early use of bitumen were initiated by Nissenbaum *et al.* (1984) on samples recovered from Arad and Small Tel Malhata, demonstrating that they are similar in composition to some large floating blocks of this material recovered from the Dead Sea. Chemical analyses were made by conventional microanalytical techniques, plus infra-red spectrometry separating the bitumen into classes of compounds (*idem*, 158).

In a more comprehensive study of bitumen samples from the site of Maadi,[2] near Cairo, and from EB I sites (Wadi Gazzeh/Nahal Habesor Site H, Palmahim, Tel Erani), and IBA sites (Ein Zik, Nahal Rephaim) of the southern Levant, all were shown to have a common origin in the Dead Sea floating bitumen blocks as well (Connan, Nissenbaum and Dessort 1992). In this volume as in a previous work (Milevski, Marder and Goring-Morris 2002), we assume that archaeological bitumen found in EB sites originated in the Dead Sea.

B. Distribution and Discussion

Numerous bitumen lumps, sickle blades and pottery sherds smeared with bitumen were found mainly in the central regions of the southern Levant (Figure 9.1). A review of archaeological contexts were lumps sickle blades and sherds with bitumen were found at EB sites is presented in Table 9.1 and Figure 9.2 (and see Milevski, Marder and Goring-Morris 2002; Milevski 2005:223–8).

Bitumen from EB contexts has been found mainly at EB I sites. However, it has also been noted, albeit to a considerably lesser extent, in EB II and III strata. This could suggest that bitumen may not have been as readily available in later EB phases as it was in the preceding period. After all, the major source for this material is the Dead Sea, in which lumps of it appear. These lumps are

the result of occasional or episodic releases of it, apparently from fissures located below. It is possible that during EB II and EB III the material was less available. Alternately, this bias could merely result from a dearth of available information on bitumen utilization in the later periods. Notably, bitumen has been associated with several sites dating to IBA (Connan, Nissenbaum and Dessort 1992; Nissenbaum and Connan 1999; U. Avner, pers. comm.). This might indicate that during the middle of the third millennium BC, the appearance of bitumen was rare.

The spatial distribution of bitumen changed during the course of EB IA and EB IB (Milevski, Marder and Goring-Morris 2002) (Table 9.1). During EB IA (mainly Early EB IA) there is a concentration of bitumen lumps and smeared tools in the Central and Southern Coastal Plain; an exception is found at Biqat Nimra in the Eilat area.[3] This is probably also a time when bitumen was exported to Egypt where it is found at Ma'adi.

The EB IB period, especially its last phase, exhibited the highest density of sites in southern Canaan yielding bitumen samples (Milevski, Marder and Goring-Moris, *idem*). However, it is important to note that during the entire EB I period there is a relatively equal distribution of modest quantities of bitumen through the sites and the sub-regions presented here.

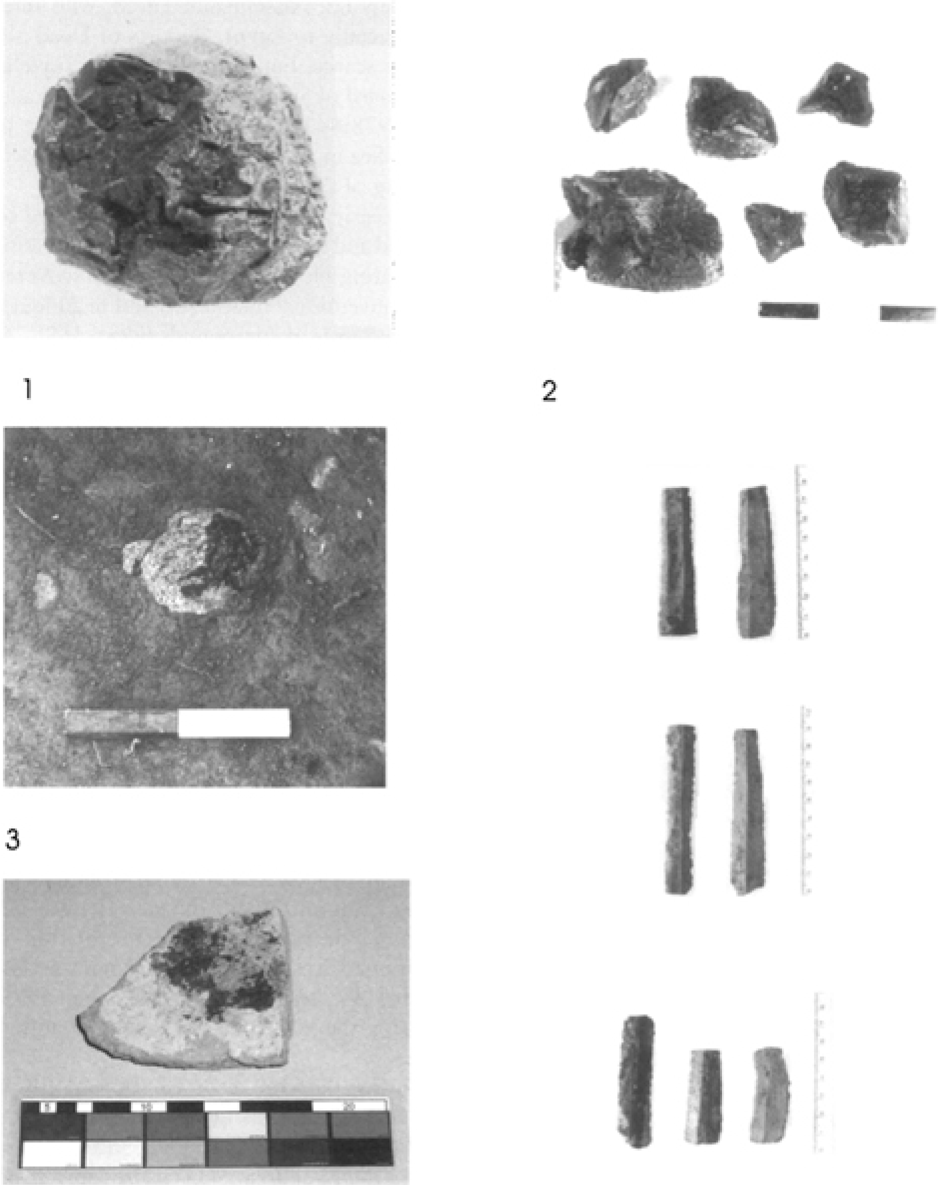


Figure 9.1 Bitumen and bitumen on sherds and flints. 1. Bitumen lump from Palmahim Quarry (courtesy of E. Braun, IAA). 2. Bitumen lumps from H. Illin (Tahtit) (courtesy E. Braun, IAA). 3. Bitumen lump from H. Ptora in situ (courtesy of Y. Baumgarten, IAA). 4. Pottery sherd coated with bitumen from Lod (courtesy of E. Yannai and O.Marder, LAA). 5. Canaanean blades coated with bitumen (courtesy of E. Braun, LAA).

Table 9.1 Distribution of bitumen and bitumen related objects.

	Lamps and objects				*On pottery*				*On flint tools*				*References*
Sites	*IA*	*IB*	*II*	*III*	*IA*	*IB*	*II*	*III*	*IA*	*IB*	*II*	*III*	
B. Shean										+			Bankirer and Marder 2007, in press a
T. Dalit						+	+						Gophna 1996:134
Shoam		−				+				+			Y. Nadelman, pers. comm.
Lod		+				+				−			van den Brink 1999:64; Yannai and Marder 2001
Jericho									+?	−?			Crowfoot Payne 1983:720, Pl. 36:1-3
B. edh-Dhra									+?	−?			McConaughy 2003:479
H. Illin		+				+				−			Marder, Braun and Milevski 1995
N. Yarmuth		+											E. Eisemberg, pers. comm.
T. Yarmuth			+	+									de Miroschedji 1988:87, Pl. 47:2
Lachish	−												Tufnell *et al.* 1958:71
H. Ptora	−				+				+				Milevski and Baumgarten 2008:615
T. Erani	+	+											B. Brandl, pers. comm.
T. el Hesi				+									O'Connell 1978:89; Toombs 1983:44
T. Hebron				+									Eisemberg, in press
T. Halif	+	+											Alon and Yekutieli 1995:181; Seger *et al.* 1990:4; T.E. Levy and D. Alon pers. comm
Arad			−							+	+		Amiran *et al.* 1978:58
S.T. Malhata		+											Amiran, Ilan and Arnon 1983:77–80
Palmahim	+	+							+?	+			Gorzalczany, Nissenbaum and Dessort 1992
Nizzanim	+	+											Yekutieli and Gophna 1994:180
Afridar	+								+				Baumgarten 2004; Braun and Gophna 2004; Khalaily 2004; Zbenovich 2004b
Site H	+												Gophna 1976, 1995a:17
B. Uvda											+?		Avner 1990
B. Nimra					+								Sebbane and Avner 1993:34

Note: Roman numbers related to periods within the EB. IA= EB IA; IB: EB IB; II = EB II; III = EB III.

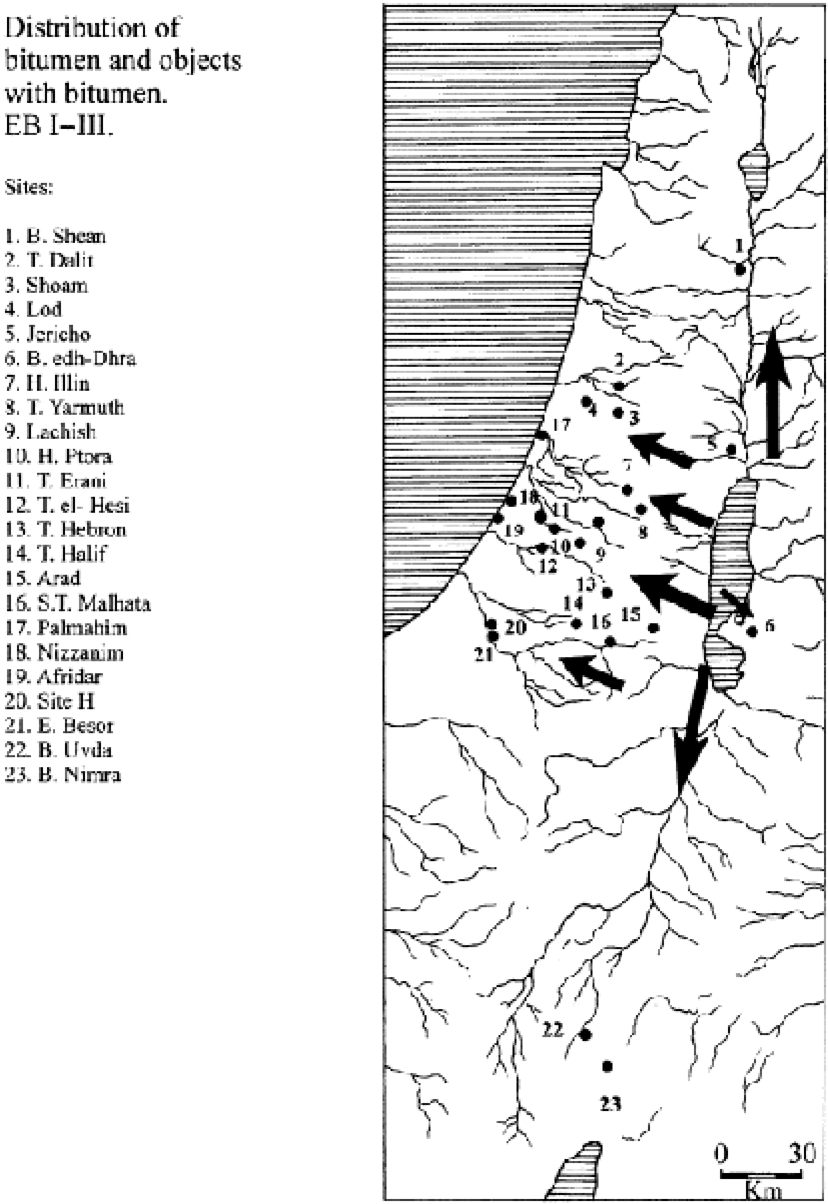


Figure 9.2 Distribution map of bitumen and bitumen related objects during the EB I–III.

The bitumen trade must have been quite restricted in scope, especially if we compare this commodity to others that had wider geographic circulation, such as ceramic vessels and flint tools. This is probably due to the sporadic availability of the raw material itself. It is suggested here that for this reason its value may have been high. The case of third millennium BC Ebla, which acquired bitumen from northern Mesopotamia may be analogous. The value of each shekel of bitumen was 1/3 of that of a silver shekel (Pettinato 1981:187, Table VII, 7) the same value as lapis lazuli, and 18 times the value of copper.

It is suggested that those involved in the procurement and distribution of bitumen during the fourth millennium BC were local inhabitants, analogous to the Nabateans or, more recently, the Bedouin who peddled the material as far as Damascus (see above). They would have monitored the south end of the Dead Sea in search of bitumen and would have extracted it whenever it appeared. The exact routes by which the bitumen was dispersed within this trading network are difficult to pinpoint at present. However, it seems most probable that the primary network extended from the shores of the Dead Sea through the Arad and Beersheva valleys northwards to the Shephelah, and thence to the coastal plain. On rare occasions it extended further, to Egypt. Subsidiary networks extended north and south along the Great Rift Valley.

Since the amounts of bitumen recovered at any one time would not have been great, a few donkeys would have sufficed for its transportation. Certainly, it appears that the main concentration of bitumen was in southern Canaan. Bitumen used for hafting and other purposes was found mainly within an area up to 75 km from the sources.[4] The principal routes for bitumen distribution within this core area were: the Ayalon-Lod Valley, Nahal Sorek, the southern Shephelah (Nahal Lachish), the northern Negev including the Arad area in the east (Beersheva valley), and the Southern Coastal Plain through Wadi Ghazza/ Nahal Habesor.

To the best of our knowledge there are no reports of bitumen utilization during the EB I–III in Canaan north of the Lod Valley or south of the Beersheva Valley, with two exceptions, Bet Shean and Biqat Nimra.[5] Both exceptions probably reflect natural and easily traveled routes from the Dead Sea along the Rift Valley. Both the Jordan Valley and the Aravah were routes through which various merchandise (pottery, shells, and copper) circulated (and see below). Bitumen found at Maadi, Egypt, is part of a secondary area of distribution that probably extended during the EB IA from the Southern Coastal Plain through northern Sinai to Egypt.[6]

2. Carnelian

A. Definition

Semiprecious stones such as carnelian, turquoise, hematite and other brightly colored minerals were used for pendants and beads during the EB Age (Figure 9.3). In Egypt, carnelian, like other semiprecious stones, was thought to represent deities and to guarantee immortality.[7] Because carnelian was the most commonly found, brightly colored stone as it is, there is sufficient data available for studying it within the context of this work.

The best typological division of beads is still the work by Beck (1928). We will simplify his types as biconic, barrel-shaped, disc-shaped or cylindrical-shaped, in order to facilitate the understanding of the finds.[8]

B. Sources

Carnelian is a form of chalcedony, one of the best-known materials for bead preparation in antiquity. The attraction of this stone is due to its red-orange color, its hardness and the fact that it can be worked to obtain many forms (Clark 1986:70-2). In the southern Levant there are rare occurrences of carnelian in the Lower Cretaceous basal conglomerate in the Large Crater and Ramon Crater in the Negev (N. Porat, pers. comm.; McGovern 1985:105; Zuckerman 1996b:277). However, this source was not confirmed. Some scholars point to an Egyptian origin for carnelian (e.g. Scheftelowitz 2002b:360 quoting Lucas (1962:391–2).[9] That the carnelian found in the southern Levant derives from sources in Afghanistan and the Indus region via Mesopotamia (and see Pettinato 1972:74, Potts 1993:389–90), is very difficult to accept, but it is considered in the discussion below.

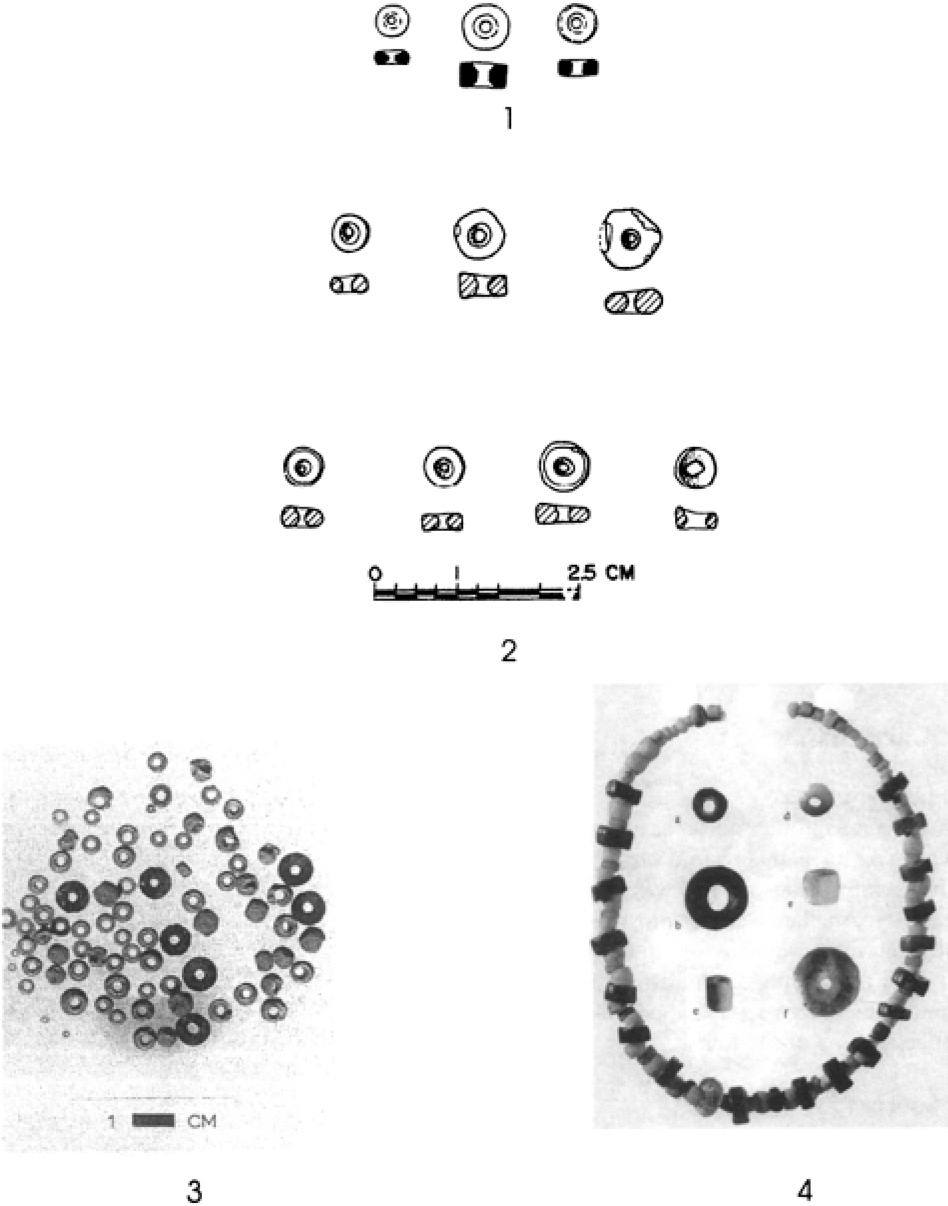


Figure 9.3 Carnelian beads. 1. Carnelian beads from Jericho, Tomb K2 (after Kenyon 1965:Fig. 6:1). 2. Carnelian beads from Bab edh-Dhra, Tomb A10 (after Wilkinson 1989a:Fig. 172:1–3, 5–8). 3. Carnelian beads from Bab edh-Dhra, Tomb C1 (after Wilkinson 1989a:Fig. 178). The large beads are made of carnelian. 4. Group of beads from Arad (Stratum III). Bead b is made of carnelian (after Amiran *et al.* 1978:Pl. 118:6, courtesy of the Israel Exploration Society).

C. Distribution and Discussion

Distribution of carnelian beads according to periods, sites and types is

presented in Table 9.2 and Figure 9.4. A description of the finds and their archaeological contexts according to regions and sites could be found in Milevski 2005:232–5.

Since no carnelian raw material or workshops have been found it is also difficult to pinpoint the probable sources and centers of production, if they existed at all in Canaan. Nevertheless, we can offer some preliminary conclusions based on distribution of carnelian beads and their utilization.

Table 9.2 Distribution of carnelian beads according to periods and types.

Types *Sites*	*Bicone and barrel*	*Cylinder*	*Disc*	*Varia*	*References*
EB I					
Gadot	1				Greenberg 2001b
Kabri	1				Scheftelowicz 2002b:356, Fig. 10.6:4
Megiddo		2			Sass 2000:392, Figs. 12.30:2,4
Hazorea Tomb 33			7		Meyerhof 1986:Pl. 30
K. Monash			+		Hestrin and Tadmor 1968:285, Fig. 15
E.Hanatziv			+		Amiran and Sebbane 1986; Ilan 2002:98
T. el-Farah (N) Tombs 3 and 5					de Vaux and Stève 1949:108,126, Pl. IVb:17
Jericho Tombs					Kenyon 1965:19–26, Fig. 6:1-3, 11
A127			1		
K2			339, 53		
Givatayim		+			Sussman and Ben-Arieh 1966:39, Pl. 8.5
T. Aviv Kaplan junction		+			E. van den Brink and E. Braun, pers. comm.
T. Dalit			2?		Sadeh 1996:Fig. 70:11, 12
Bab edh-Dhra Tombs	11	1	Ca. 190		Wilkinson 1989a
EB II					
Ashera					F. Smithline 2001:Fig. 28:1-20
B. Yerah			+		Ben-Tor1971b: opposite 114
Q. Ata		6			Golani 2003:223, Fig. 7.11:1, 2
T. Dalit			2?		Sadeh 1996:Fig. 70:11, 12
Arad			20		Amiran *et al.* 1978: Pls. 68:4, 69:6, 15; 118:10b
EB III					
Jericho					Kenyon 1960:Fig. 65:2
Tomb F3	4	3	1		
Tomb F2				1	
EB I–III					
Jericho (Tel)			1		Kenyon 1965:19 26, Fig. 6:1 3, 11
Lod				+	Pers. observation
Lachish 1535	1		1?		Tufnell *et al.* 1958:73, Pl. 29:6
Bab edh-Dhra Tombs					Wilkinson 1989b:461–70

Note: (+) stands for unknown numbers.

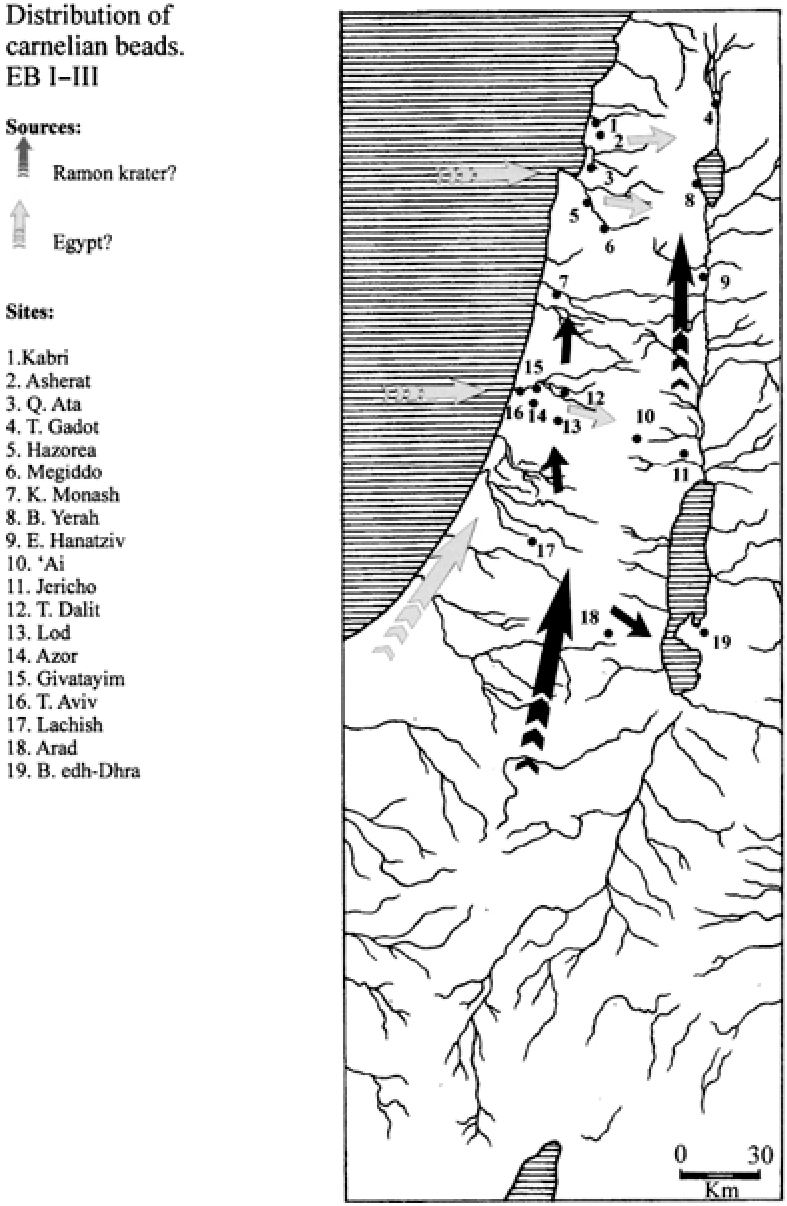


Figure 9.4 Distribution map of carnelian beads.

Most of the beads were encountered in burials and their ritual character seems certain. In several cases the beads belong to a necklace.

According to the distribution pattern of carnelian beads in all periods (Table 9.2, Figure 9.4) under discussion, there is a concentration of sites in the Central Coastal Plain and in the area near the Carmel in the Western Galilee and Jezreel Valley. The Jordan Valley again seems to be one of the routes of distribution, but there are no clusters of sites alongside the route. Rather there

are scattered sites where beads have been found. The Jericho burials are the main locale for the beads from EB I to EB III. Interestingly, Bab edh-Dhra has produced the largest quantity of beads in tombs dated to EB IA.

In the light of the above-described evidence we suggest two main possibilities for the production and distribution of carnelian beads:

1. The carnelian beads were sourced and produced from local outcrops in the Ramon Crater area and distributed through the coastal plain and the Jordan Valley as the main areas of supply (the black arrows in Figure 9.4). The problem with this hypothesis is that aside from the fact that no quarries or workshops have been found, sites of the Negev as the Camel Site (Rosen 2003b) around this probable source are totally devoid of carnelian beads. One of the plausible explanations for the fact that these small finds were not preserved in the archaeological record can be found in the difficulty in identifying floors or living surfaces and the probably brief existence of these sites. Since no EB burial sites have been found in the Central Negev, the odds of finding beads there are also considerably decreased.
2. Carnelian beads were imported from Egypt, whether along a terrestrial route (during the EB I) or by maritime means along several points on the coast (the gray arrows in Figure 9.4). The problem with the assumption that carnelian or carnelian beads originated in Egypt is that during EB I-III in the southern Levant beads are relatively scarce—only a few hundred are known—while their occurrence is greatly multiplied during the IBA, as is attested by tens of thousands of beads. During that period relations with Egypt were almost totally interrupted.

At any rate the distribution of carnelian beads was part of the southern Levant circulation of commodities, in this case, destined for aesthetic and ritual purposes. If carnelian was derived from sources in the Negev, the raw material or the beads could have been transported together with local pottery and/or sandstone tools that were distributed northwards to the center region.

No visible typological differences in the distribution of the beads was observed. Actually, most authors claim that beads are usually not chronologically diagnostic and that from the fourth to the second millennium the same shapes (circular, barrel, ellipsoid), materials, and perforations (biconical for circular and short barrel beads, drilled straight from two sides for long barrel beads of hard minerals, and plain perforations for frit barrel beads) are consistently present (e.g. Ilan 1992). In sum, as long as we do not have chemical confirmation of the sources and archaeological remains of the production centers for carnelian beads in the southern Levant, only general conjectures can made for the exchange of these objects.

Notes

1. The exchange and trade of salt has been the focus of considerable research in the archaeological, anthropological and historical fields (Rathje 1972:390–1; Godelier 1977; Guichard 1997; Amar 1998.)

2. This site is contemporary with Early EB I (i.e. EB IA) of the southern Levant.

3. Since the samples from Jericho and Bab edh-Dhra' have been dated only to the EB period in general, they may affect the spatial distributions by sub-period.

4. In sites where no bitumen was found, other kinds of adhesive or resin seems to have been used for hafting (cf. Bar-Yosef 1987).

5. During the IBA, bitumen and flint tools with bitumen appear at Ein Zik (Connan, Nissenbaum and Dessort 1992; Nissenbaum and Connan 1999), and Biqat Uvda (U. Avner, pers. comm.), adjacent to the Aravah Valley, and probably represent an independent network route to the Red Sea.

6. There is evidence of this route during EB I (cf. Oren 1973, 1989; Yekutieli 1998). It was mentioned in texts already in the First Intermediate Period and it existed during the New Kingdom (cf. Gardiner 1932). However, Egypt was not a primary objective of a bitumen exchange network (Milevski, Marder and Goring-Morris 2002), as was suggested by Connan, Nissenbaum and Dessort (1992:2744, Fig.1). According to these scholars, Arad was the center of the network, which distributed the material from the Dead Sea area to Egypt. However, as is evident from data presented here, Arad was not occupied during the EB IA, when bitumen reached Maadi.

7. The use of carnelian and other semiprecious and precious stones and minerals has been the subject of several Egyptological studies relating these materials to divinities and burial practices (e.g. Andrews 1994:100–6; Aufrère 1997; Bianchi 1997).

8. For production techniques of beads in Mesopotamia and Egypt, including carnelian beads, see Chevalier, Inizan, and Tixier (1982), Stocks (1989), and Holmes (1992).

9. See Aston, Harrell and Shaw 2000:26–7.

III
TRANSPORTATION, MERCHANTS AND NETWORKS

The next extension of division of labour was the separation of production and commerce, the formation of a special class of merchants…

(Marx and Engels 1970)

10

Transportation and the Cult of Exchange

This chapter discusses utilization of domesticated donkeys (*Equus asinus*) for local exchange and its ideological aspects on EB Age society. It reviews data concerning the extent of use of these animals as beasts of burden and and the existence of a specialized social stratum or group of persons related to their use. Amiran (1985) and Ovadia (1992) have previously suggested that domestication of donkeys began in this period, and with it the innovation of pack transportation by animals, was likely to have engendered such a class of people related to it, and to a special cult reflecting their activity. This interpretation is based on both faunal remains and miniature, artistic-cultic representations from the archaeological record and bolstered with additional ancient Near Eastern sources and ethnographical examples thought likely to represent analogous situations.

In this work, the donkey is viewed not just as a commodity, but mainly as a commodity meant to transport commodities (Zaccagnini 1976:545–82; Buccelatti and Kelly-Buccelatti 2002 with particular attention to bibliography). There are several examples in historical sources from Mesopotamia and Ebla (*idem*) for the breeding of expensive, equid hybrids. Ethnographic sources show that the breeders of donkeys could exist separated from the users of the animals as in the case of the Solubba of the Arabia Peninsula who breed donkeys for other tribes (Betts 1989). While we do not know if such separate groups existed in the EB, we might assume that if they did, both would have been participants in cultic activities of their related occupations.

Despite the fact that the value of donkeys in the EB for the region under discussion remains unknown, it is possible to make comparisons with other regions of the Ancient Near East where documents existed on this matter.

Values of donkeys changed from place to place and according to the period, from *ca.* 11-20 silver shekels in Akkad during the second half of the third millennium BC, to 6 silver shekels in Nuzi in the 15th century BC (and see Chapter 2). Their value lay between 3 and 4 silver shekels (30-40 *deben*) in Egypt during the 12th–11th century BC (cf. Zaccagnini 1976:557), while at Ugarit (14th century BC) donkeys were exchanged for amounts ranging from 10 shekels of silver to 2 talents of bronze (Heltzer 1978:22).

In the Old Assyrian period (18th century BC) the caravan procedures report values of about 16-25 silver shekels for each donkey; some of the values include the harness and the fodder (Larsen 1967: 151) (and see Chapter 2). During the Neo-Babylonian period (7–6th century BC) the value of donkeys rose to 30 silver shekels. The only biblical reference to this subject is in relation to a period of crisis in Samaria when donkeys were priced at 80 shekels (2 Kings 6:25; Foster 2002:291). These values must be adjusted because the silver shekel differed from place to place. The Mesopotamian standard was 8.33 gr (per shekel) while Anatolian and Syro-Palestinian standards were closer to 11.4 gr (per shekel) (cf. Stiegliz 1979).

1. Donkeys as Means of Transportation

This section considers the physical evidence for use of donkeys. Unfortunately, data are somewhat problematic because faunal samples from many EB sites, especially those published more than three decades ago, are non-existent or inadequate (see Ducos 1968; Horwitz and Tchernov 1989). Most information comes from later fieldwork by scholars who collected faunal samples (cf. Appendix in Hesse and Wapnish 2002).

It is uncertain where donkeys were first domesticated. Domestication may have taken place in Africa which would indicate that *Equus africanus* is the probable progenitor of the domestic ass (*E. asinus*), but if it took place in Asia (cf. Davis 1987:131; Clutton Brock 1992:61–3) then its ancestor would be *Equus hemionus* (hemiones), the wild ass of northern Asia. While it used to be assumed that hemiones were domesticated (cf. Zeuner 1963), more recent archaeozoological and textual data have shown that they were probably never domesticated (Gilbert, Lowenstein and Hesse 1990:46; Clutton-Brock *idem;* Hesse and Wapnish 2002:471; Croft 2004:2284).

Equids are most often classified by archaeozoologists according to enamel patterns of their teeth, but because they are not always found in excavations, distinctions between types of equids are often not possible from the faunal record. Sometimes even without teeth, distinctions between wild African donkeys, wild hemiones, domestic donkeys and horses are possible to achieve by measuring long bones (Cutton-Brock 1992:18–22). However, such bones need to be complete to make such fine distinctions and instances of such good preservation tend to be rare. An additional problem in identification is also

found in comparisons of overall measurements of bones. Although different groups tend to fall within different ranges, there is always some overlapping in size and some specimens, due to natural variations in individual animals,[1] may fall between groups or even be misidentified.

For instance, it has been hypothesized that horses (*Equus caballus*) were not introduced into the Levant and Egypt until the second millennium BC (Clutton Brock 1992:81–4). Davis (1976:160–2), however, has argued that an equid metacarpus from Arad could possibly belong to a small horse. Horwitz and Tchernov (1989:290) have cast doubt on that identification because no teeth identifiable as horse or mule were recovered at the site. Other reports (Josien 1955) even recorded horse remains at the Chalcolithic site of Bir Abu Matar. According to measurements of equid long bones and phalanges, small domestic horses are reported to have been present in the Chalcolithic period in the northern Negev (Grigson 1993), but in the absence of teeth, similar doubts may be posed for such identifications. At any rate, horse specimens seem to have been an isolated occurrence during the Chalcolithic and EB periods, probably representing wild species.

Domestication of donkeys, as that of horses and camels, was part of a third phase of domestication when humans began to exploit animals for their secondary products: power, milk, wool, dung, etc. (Sherratt 1981).[2] Equids and camelids were mainly used as beasts of burden or for harnessing their power i.e., for carrying people, goods and for traction. Domesticated donkeys were used for plowing by the third millennium in Mesopotamia (Postgate 1986) and as draft animals (Jans and Bretschneider 1998), but it seems likely that in the Levant cattle would have been used more frequently than donkeys (cf. Clutton-Brock 1992:80ff; Grigson 1995), and the latter species was used as pack animals. The predominance of asses for these purposes is suggested based on zoomorphic figurines and later Egyptian depictions of Canaanites, and texts describing highly organized donkey caravans carrying goods to Egypt from the southern Levant (cf. Partridge 1996:95–9, see below).

A. Zooarchaeological Data

According to archaeological data from the southern Levant, equids were uncommon during the Neolithic and Chalcolithic periods, while an increase in their presence took place in the EB. At Chalcolithic sites such as Bir Safadi (Ducos 1968), Gilat (Levi 1981) and Shiqmim (Grigson 1987), equid bones represent only *ca.* 0.5% of the total number of bones (Table 21), while at EB sites there is an increase of the equid remains to *ca.* 4% of the total of animal bones (e.g. Lernau 1978; Horwitz 1985; Meyerhof and Sadeh 1993). One site, Afridar Area E, yielded a much higher percentage, with equids representing *ca.* 20% of the total number of bones (Whitcher Kansa 2004).

Following is a brief review of the data on equid remains from the EB. Table 10.1 presents frequencies of donkeys and hemiones at EB sites in relation to the

total number of identified bones. Table 10.2 calculates their frequency relative to cattle bones (i.e. the frequency of equids in relation to the total of identified bones of both cattle and equids) the only other potential beast of burden at this time. The available data is presented by region in a north–south progression.

Gamla, the only site in the Golan for which data are presently available, has produced three donkey bones out of a total of 109 (Horwitz and Tchernov 1989:Fig. 2; L.K. Horwitz pers. comm.). In the Western Galilee a few bones were found in EB II contexts at Kabri (Horwitz 2002:397) but no frequencies are given. At Bet Haemeq, *E. asinus* remains represent 4% of the total bones from stratum III (EB IB) (Meyerhof and Sadeh 1993).[3] To the south, at Qiryat Ata, very few bones of *Equus asinus* were dated to late EB IB and EB II in Areas A-G and L (Sadeh 2000; Horwitz 2003a:229–30, Table 8.2), with frequencies of 0.5% and 0.8%, respectively. Further to the east at Tel Kinrot *E. asinus* represents 0.8% (n = 3) of a total of 341 identified bones found in EB I-II strata (Hellwing 1988–89).

In Lower Galilee, at Yiftahel (EB IA), *E. asinus* bones appeared in Stratum II at a rate of 1% of the total number of bones (Horwitz 1997) while at En Shadud in the Jezreel Valley (late EB I or EB IB), diagnostic bones, four (4.1%) were found belonging to a donkey or a hemione (Horwitz 1985) within a small sample of 97 bones (see Figure 10.1:1). At Tel Qashish (Horwitz 2003b:433, Table 39) only one bone of an ass, probably *E. asinus* (0.4% of total bones in the stratum) was identified in an EB III context. Remains of what was defined as small equids were found in Tombs 903, 910 and 100 at Megiddo, but they have not been defined as either donkey or hemione (Bate 1938:211). It has been suggested that some of these remains may have belonged to a horse, but this suggestion is based on the size of the limbs and not on remains of teeth (see above) and so is subject to doubt. East of the Jordan Valley the information is very incomplete. Preliminary reports on excavations at Tel esh-Shuneh cite equid remains as 'sporadically represented in the Chalcolithic-EB I faunal repertoire' (Croft 1994:131), and equids are mentioned (0.5% of total bones) as being present at Tell Abu al-Kharaz but their stratigraphic contexts are not given (Fischer 1997:Table 1). Excavations at Pella (Tabaqat Fahl) have yielded one equid bone out of a total of 835 bones dating to EB I or II (Bourke, Sparks and Sowada 1994).

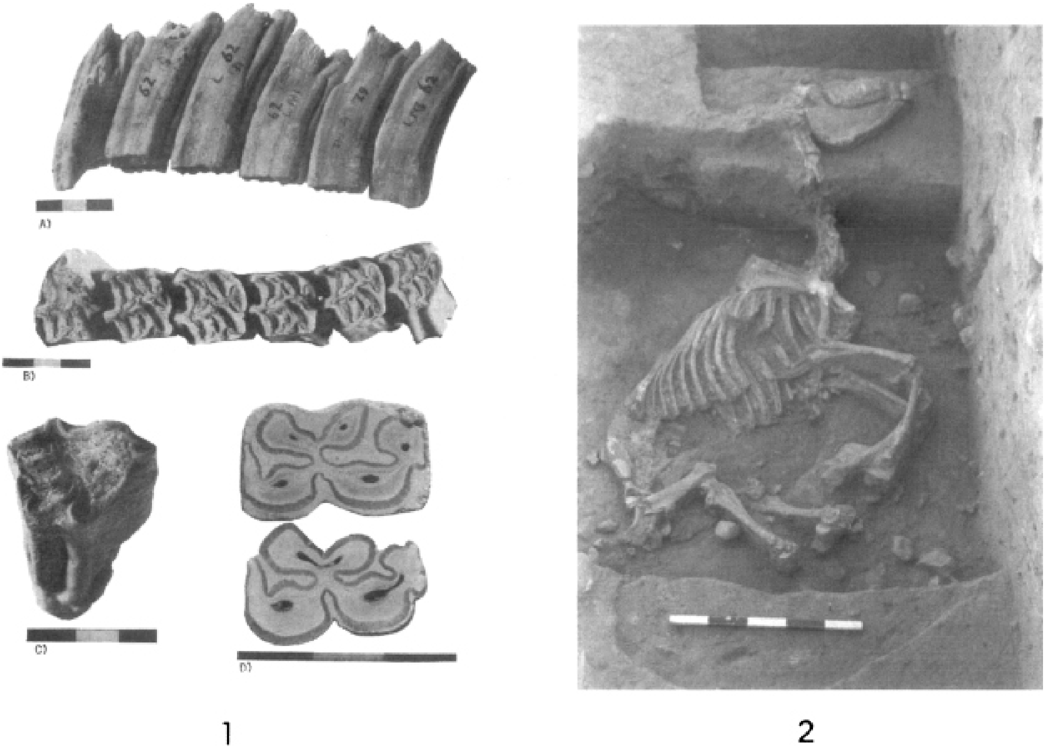


Figure 10.1 Donkey remains. 1. Teeth, En Shadud, EB I (after Horwitz 1985:Pl. XIII). 2. Complete skeleton, Lod, EB II (courtesy of E. Yannai and O. Marder, IAA).

At Jericho differentiation of equid remains was difficult because of the small number of bones (N = 19), but according to Clutton-Brock (1979:144–5), enamel patterns of teeth[4] suggest that they are most probably of *E. asinus.* In the Central Hill Country, a donkey's jawbone is reported from Phase IV of the sanctuary at ‘Ai (Callaway 1972:190).

Tel Aphek in the coastal plain has yielded only ten identified bones of *E. asinus* from EB IB contexts and a single bone from an EB II level (Hellwing 2000:304, Tables 15.2, 15.16). They represent *ca.* 2% of the total bones in both periods (see Hellwing and Gophna 1984). In the Ayalon Valley, remains of donkeys were found at Tel Dalit (Strata II-V of Area B). In Stratum V (EB IB) they represented 0.5% of the total number of bones; in Strata IV-II (EB II) they represent between 0.5 to 2.2% (Horwitz, Hellwing and Tchernov 1996).[5] Donkey remains (*ca.* 10% of total individuals) were present as well at Shoham (N) Cave 2 where they were dated to the EB IB (Horwitz 2007). At Lod (Yannai and Marder 2001), a complete donkey skeleton (probably intentionally buried in a pit) was found in Area A2 in an EB II context (pers. observ.) (Figure 10.1:2). The vertebral column was broken behind the skull, but the reason for that breakage is not clear It is possible the donkey was intentionally sacrificed, although this interpretation is far from certain.

Table 10.1 Relative frequencies of equids at EB sites.

Period / Sites	*EB IA* %		*EB IB* %		*EB II* %		*EB III* %		*EB I–III* %	
	D	*H*	*D*	*H*	*D*	*H*	*D*	*H*	*D*	*H*
Gamla									2.7	
T. Na'ama					+					
T. Kinrot									0.8	
Kabri					0.5					
B. Haemeq			4.0							
Q. Ata			0.5		0.8					
Yiftahel	1.0									
E. Shadud			4.1	?						
T. Qashish							0.4			
Megiddo			+?	+?						
Pella									0.1?	0.1?
T. esh-Shuneh	?									
T. A. al-Kharaz									0.5?	0.5?
T. Aphek			2.2		2.1					
T. Dalit			0.5		2.2					
Shoham (N)			10.5							
Lod			+		+					
Gezer				+						
Azor	8.0									
'Ai					+					
Jericho									3.9	
T. Yarmuth					+		+			
Lachish							+			
T. Erani									5.0?	5.0?
T.Halif (Tillah)	1.2	2.0	2.1	1			+			
Afridar Area E	20.9									
Area F	14.9									
Area G	1.7									
Area L	6.8									
T. Ikhbene	8.0		7.5							
Site H	25.0									
E. Besor			9.5							
T. es-Sakan							+?	+?		
Arad			0.8		3.3					
B. edh-Dhra									13.0	
Numeira							0.9			
B. Uvda 917					+?					

Note: D = donkey, H = hemione. (+) denotes presence but frequencies are not given.

Further to the south, at Gezer, a left tibia of an E. *hemionus*, still attached to the astragalus and calcaneum, were found in Cave I.3A (EB IB; Legge 1988:39). Donkey remains were also found in the Central Coastal Plain at the EB IA settlement of Azor (Horwitz 1999:Tables 8, 10) in relatively high frequencies (8%). Faunal remains from Tel Yarmuth (seasons 1980–83) include bones from *E. asinus* (Davis 1988:144–5) from EB II and EB III contexts, but no statistics are reported. Equids are referred to in the EB strata of Tel Erani (Horwitz and Tchernov 1989:290) and Lachish (EB III, Bate 1958) but no species or

frequencies are given.

Table 10.2 Equid frequencies in relation to probable burden animals.

Period	*Chalcolithic*			*EB IA*			*EB IB*			*EB II*			*EB III*		
Sites	*E*	*C*	*%*	*D*	*C*	*%*	*D*	*C*	*%*	*D*	*C*	*%*	*D*	*C*	*%*
T. Dan										–	33.0	–			
Meona										–	26.0	–			
Kabri							–	36.0	–	0.5	34.0	1.4			
B. Haemeq							4.0	20.0							
Qiryat Ata							0.5	30.8	1.6	0.8	34.5	2.3			
Yiftahel				1.0	23.0	0.4									
E. Shadud							4.1	22.0	1.6						
T. Qashish							–	16.0	–	–	30.5	–	0.4	56.0	0.7
Metzer	0.5	20.6	2.4												
Munhata	0.3	31.2	0.9												
T. Aphek							7.7	27.9	2.2	0.8	38.6	2.0			
T. Dalit							0.5	14.0	3.4	1.6	22.6	6.6			
Azor				8.0	13.0	32.0									
G. Guvrin	3.8	36.2	9.5												
Afridar Area E				20.9	19.7	51.6									
Area F				14.9	29.0	33.9									
Area G				1.7	21.8	7.2									
Area L				6.8	18.9	26.5									
T. Ikhbene				8.0	25.8	23.7	7.5	50.0	13.0						
Site D	1.6	36.9	4.1												
E. Besor							9.5	25.0	27.5						
T. Halif				1.2	7.6	13.6	2.1	13.4	13.5				+		
Arad							0.8	7.7	9.4	3.3	7.6	30.3			
A. Matar	3.0	19.0	13.6												
Shiqmim	0.2	11.5	1.7												
Numeira													0.9	–	100.0
B. Uvda 917										1.5?	–	100.0			

Note: C = cattle; D= donkeys; E= equids

At Tel Halif (Zeder 1990) in the northern Negev, equids, apparently donkeys, are present in the EB I and EB III strata, but their frequency is difficult to calculate from published data. At the same site (also called Nahal Tillah; Levy *et al.* 1997:24–5), donkeys appear in an EB IA Stratum (III) in a ratio of 1.2%, and in an EB IB Stratum (Ia/b) as 2.1% of the total number of bones. Notably, they were not present in Chalcolithic Stratum IV It is notable that at this same site equid bones (without differentiation) appear at a rate of 7.6% in the EB IA level and 2.6% in the EB IB phases. One equid bone (not definitively identified as a donkey) is present in Stratum IV

Continuing southeast to Arad, remains of donkeys were present in several strata in different percentages of the total number of animal bones: Stratum IV (EB IB, 0.8%), Stratum III (EB II, 2.2%), Stratum II (EB II; 3.3%). In Stratum I (EB II) the rate falls to 1.0% (Lernau 1978:Table 2). Notably, no bones of donkeys were found in Stratum V (Chalcolithic).

In the Dead Sea Plain, *E. asinus* was found at Bab edh-Dhra in most of the

fields at the town site. Statistics for the site are haphazard. Donkey bones totaled 13% of all animal bones from Field XIV (Finnegan 1976:51, Table 1; 1979:Table 1) but no further frequencies and stratigraphic ascriptions are provided. At Numeira (EB III), donkey remains are only 0.9% of the total number of animal bones at the site (Finnegan 1979:Table 1).

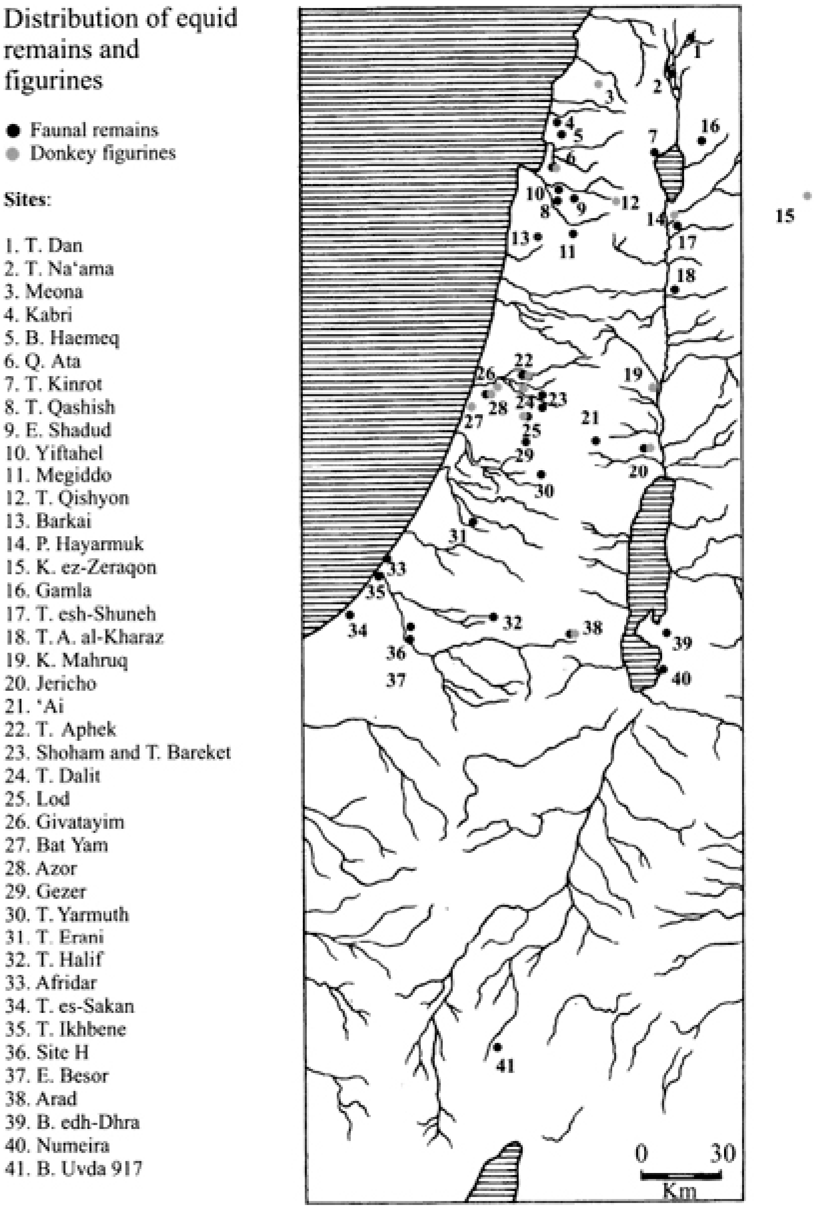


Figure 10.2 Distribution map of equid remains and figurines.

The highest rates of equids, nonetheless, are found in the Southern Coastal

Plain at EB IA Afridar (Ashkelon) Areas F and E (Whitcher Kansa 2004). The equid remains, probably *E. asinus* or *E. hemionus*, reach 13% and 18% respectively. This is a surprisingly high proportion when contrasted with the other EB sites quoted above, as Whitcher Kansa (*idem*) pointed out.

While the sample size of Area F *per se* is too small to determine whether the bones represent wild or domestic population, the presence of other domesticated animals in that area suggests that equids were hardly hunted for subsistence. Furthermore, the majority of equids in Area E survived to adulthood, and therefore were not part of the diet (*idem*).

Further to the south in the Coastal Plain, at Taur Ikhbene, bones of *E. asinus* were found in EB IA and EB IB contexts representing *ca.* 8% of the total number of animal bones (Horwitz *et al.* 2002:116, Table 5). To the east, in the Nahal Habesor basin, Site H produced an almost complete articulated ass buried in a pit dated to EB IA (*idem*, 110–11, Figs. 2-3). It is most probably a domestic donkey, although several bones distorted *in situ* could indicate that they belong to wild equids. At the nearby site of En Besor, a few bones of a donkey were found representing 9.5% of the total bones during the EB IB (Horwitz *et al.* 2002:119, Table 2). At Tel es-Sakan, a site south of Wadi Ghazzeh, equid bones comprise up 3% and 0.6% (EB I and EB III respectively) of the total bones found. In the EB III stratum, one complete skeleton of a donkey was found buried in a room of a building complex (de Miroschedji *et al.* 2001:97), interpreted here as likely to be a structure of public significance. In the southern Negev, a fragment of a proximal metacarpal of an equid, probably *E. asinus*, was found in an EB II context at Biqat Uvda 917 (Horwitz, Tchernov and Mienis 2001: 122).

B. Donkey Figurines and Other Representations

Equid figurines have been found in a number of EB contexts. They appear to be part of a long tradition[6] (see below). In light of the evidence discussed above, they are assumed to represent donkeys. Following is a discussion of each of these figurines (see Table 10.3, and Figures 10.3–10.4) by site, in a geographical progression from north to south (and see Figure 10.2).

At least two figurines representing donkeys carrying two jars were found at Tel Dan at the northern limits of the Huleh Valley. These objects, made of MW, were found in EB II levels at the site (Greenberg 1996b:Fig. 3.38:5; Greenberg and Porat 1996:Fig. 4:3; here Figure 10.4:2). A probe at Meona unearthed the head of what appears to have been a donkey.[7] It was found in fill above a stone construction atop bedrock, and has no definitive chronocultural context (E. Braun, pers. comm.). Meona has yielded EB I and EB II pottery as well as material from later periods. Although the context of this object remains unclear, its ascription to the EB Age is a reasonable supposition, especially in light of another equid figurine with a similar head found at Qiryat Ata Area G, in Stratum I (Golani 2003:Fig.7.4:l), dated by the excavator to EB II.

Table 10.3 Distribution of donkey figurines.

Sites	*Periods*	*EB IB*	*EB II*	*EB III*
T. Dan			+	
P. Hayarmuk		+		
Meona			+ ?	
T. Qishyon		+		
Q. Ata			+	
Barkai			+	
K. ez-Zeraqon			+ ?	
K. Mahruq			+ ?	
Givatayim		+		
T. Aphek			+ ?	
T. Bareket			+	
Lod			+	
Jericho		+		+
B. Yam		+ ?		
Arad			+	

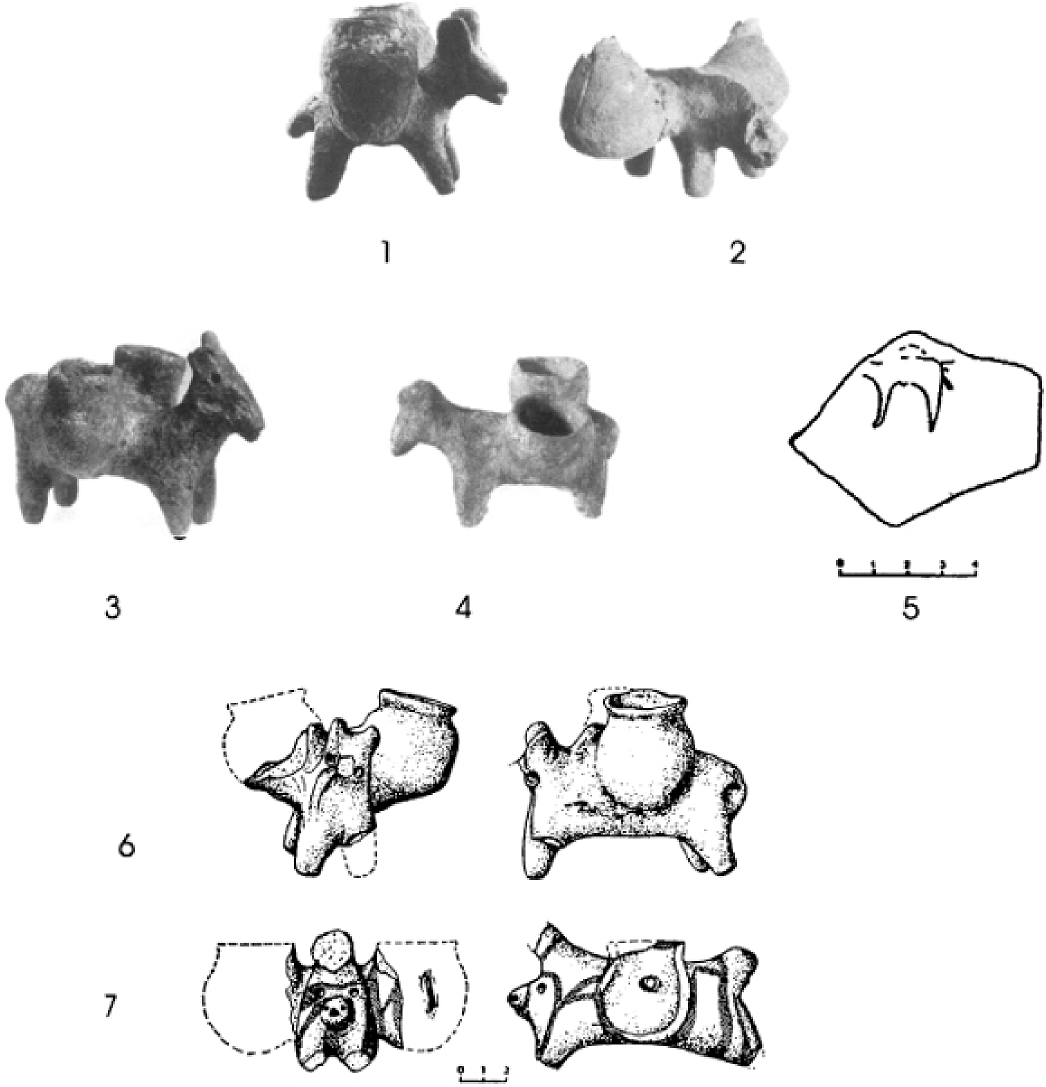


Figure 10.3 Donkey figurines and drawings, EB I 1-2. Azor (Amiran 1985:P1. XLVI:3-4). 3.Bat Yam (Gophna 1974:P1. 13:19). 4. Barkai (after Yannai 2001:Fig. 73). 5. Megiddo (after Engberg and Shipton 1934: Fig. 10, L). 6-7. Tel Aphek (after Eitan 1969:Fig. 3:1-2).

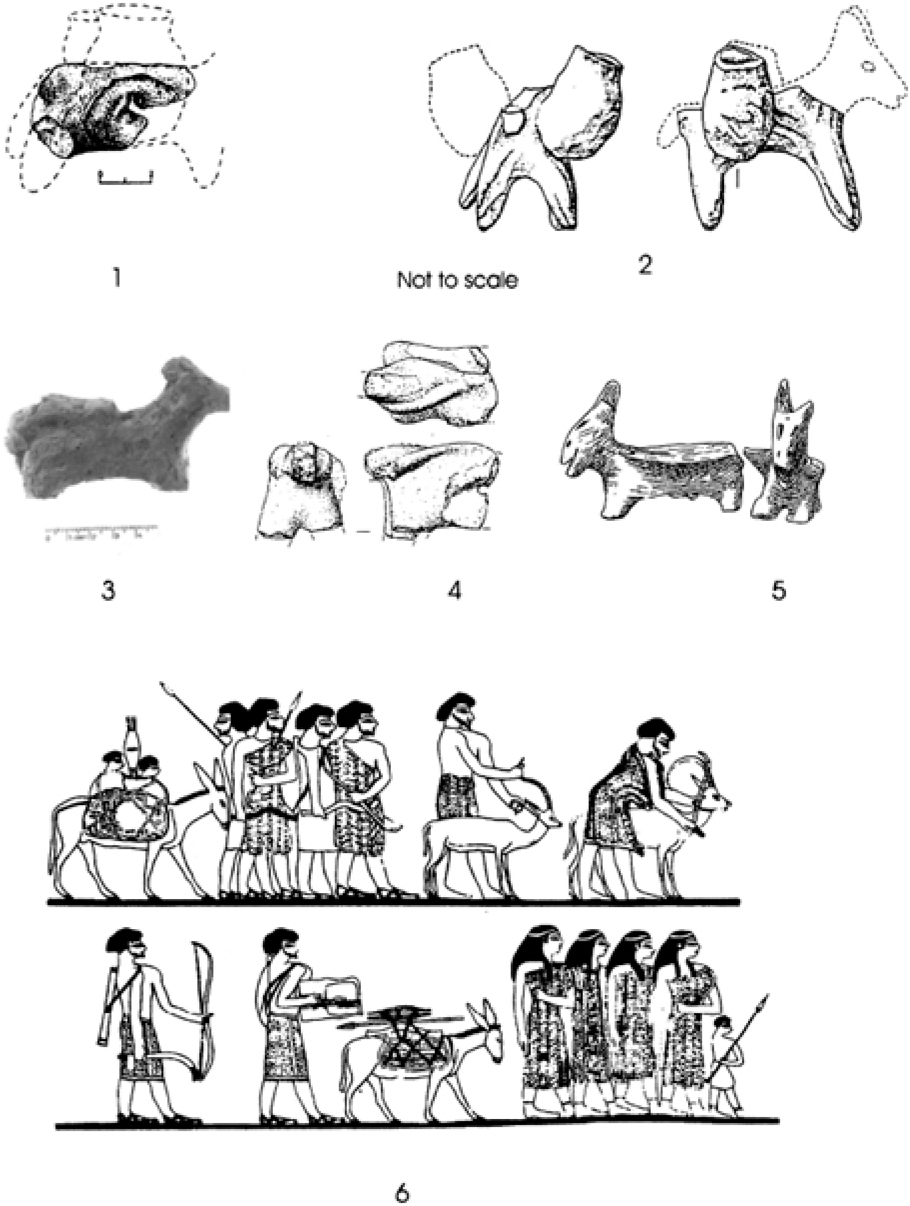


Figure 10.4 Donkey figurines and drawings, EB II–MB II. 1. Arad (after Amiran *et al.* 1978:P1. 117:6, courtesy of the Israel Exploration Society). 2. Tel Dan (after Geenberg and Porat 1996:Fig. 4:3). 3. K. Mahruq (Courtesy of H. Hizmi, IAA). 4. Lod (Courtesy E. Yannai and O. Marder, IAA). 5. Jericho (after Kenyon 1960:124, Fig. 40:1). 6. Beni Hasan (after Newberry 1893:P1. XXXI).

A figurine dated to EB I, depicting a donkey laden with containers was found at Tel Qishyon (Cohen-Arnon and Amiran 1981; Arnon 1982) in the Jezreel Valley. An incised or scratched drawing on a sherd from Megiddo (Engberg and Shipton 1934:20, Fig. 10.L) is probably a representation of a headless donkey, although its excavators preferred to interpret it as a camel (Figure 10.3:5) because the back of the animal seems to suggest a kind of hump. However, the

opinion of this writer is that there is a line separating the hump from the back of the quadruped which could depict a saddle or even part of a load in place. The proportion of the legs in relation to the body as well as their position suggests that the animal depicted in the sherd is indeed a donkey. The object probably was part of a bowl or jar and was ascribed to Stage VI, dated by the excavators as Chalcolithic (Engberg and Shipton 1934), but now recognized as late EB I (Braun 1985:63).

Further south additional figurines are known. One is from the northern Sharon at a site south of Kibbutz Barkai near En Assawir. There Yannai (2001) found a pottery figurine of a donkey burdened with two open containers in a burial cave dated to EB IB, (Figure 10.3:4). Near the northern bank of the Yarmuk River, at the site of Pithat Hayarmuk, Epstein (1985:59, Fig. 11) found a head of a bridled equid, probably a donkey. The object, a surface find, may have originated in the EB I settlement at the site, although earlier Chalcolithic and Neolithic activity there could account for it as well. Further to the east and south of the Yarmuk river, a human figurine riding a donkey was reported from Khirbet ez-Zeraqon. It is claimed as originating in a cultic context dating to EB II–III (Ibrahim and Mittmann 1987:5).

In the Central Jordan Valley, another figurine was found at Khirbet Mahruq (Hizmi 2004; here Figure 10.4:3). Virtually unpublished excavations at the site (Yeivin 1977b; Eisenberg: pers. comm.) have yielded evidence of a well-preserved, probably fortified settlement dating to EB II. This figurine is particularly interesting because it has a saddle attached with strings to the posterior of the animal.

Further south along the rift is Jericho, where the only known donkey figurine confidently dated to EB III is known. It came from Tomb D12 (Kenyon 1960:124, Fig. 40:1, Pl. VII:3; here Figure 10.4:5). The figurine is of pinkish-buff ware with grey grits, similar to fabrics of common pottery of types datable to EB III found in the tomb. The same tomb yielded examples of KKW,[8] together with other ceramic types dated within EB III (see Kenyon 1960:94–6). This donkey figurine lacks baskets or jars but its back is represented by a wide, slightly concave surface that could be interpreted as a saddle or could have been used to support a container. Two additional figurines, dated by the excavators (Kenyon and Holland 1982:555, Figs. 225: 6-7) to the Iron Age should, in the opinion of this writer, date to EB I and be identified as donkeys with panniers or jars on their backs (cf. the similarity with Figure 10.3:4, mainly in the panniers).

Several figurines, dated to EB I, depicting donkeys bearing burdens have been found in the Central Coastal Plain. Two figurines of a donkey with jars or bags were found at the foot of Tel Aphek (Eitan 1969:51, Fig. 3:1-2; here Figure 10.3:6-7). Additional two figurine fragments were recently found at Tel Bareket in EB II contexts in salvage excavations conducted by the LAA and Tel Aviv University (R. Gophna and H. Törge, pers. comm.). They are similar to a figurine found at EB II Arad (see below).

A fragment of a figurine found in Area B at Lod (Yannai and Marder 2001) (Figure 10.4:4) appears to be the posterior part of donkey and probably dates to EB II. The fragment includes the upper part of the legs. Two strings are attached to the animal in a way similar way to the figurine of Khirbet Mahruq (Figure 10.4:3).

Advancing westward to the Mediterranean littoral there are additional figurines. One, is a laden donkey from a burial cave at Givatayim (Kaplan 1993).[9] Another two, have two containers. They were found in tombs 10 and 60 at Azor (Druks and Tzaferis 1970:578, P1.40:B) dated to EB I. While Figure 10.3:1 represents a donkey with two open containers (bag-shaped), Figure 10.3:2 is an animal without head, carrying two necked jars, similar to the EB IB amphoriskoi. Another figurine was found by R. Gophna in a surface survey at Bat Yam (Figure 10.3:3). It has vessels relatively similar to those from Figure 10.3:1 (Azor) and its date, based on iconographic resemblances, is assumed to be EB I (Gophna 1974:45, Pl. 13:19). Only one example of a figurine of this type comes from a southern context. It is a fragmentary pottery figurine from Stratum I dated to EB II, at Arad. It represents a donkey carrying two bag-shaped containers (Amiran *et al.* 1978:54, Pl. 117:6; here Figure 10.4:1).

C. Containers and their Relationship to Donkeys

This section discusses the use of pottery vessels as containers for commodities and not as commodities in themselves. While a classification system according to capacity and forms is beyond the scope of this work (e.g. Schaub 1996) some questions concerning utilization of pots as containers are addressed.

There is little evidence in the archaeological record of the southern Levant of the EB Age for the use of containers to exchange dry or wet commodities (e.g. oil, wine, grain, etc.) with exception of some studies on residual material from jars that are mainly related to international exchange.[10] For instance, analyses of the contents of EB II 'Canaanite' jars (some of them fashioned of MW) from the Tomb of Djer at Abydos indicate that they contained remains of vegetable oil (Serpico and White 1996). Reportedly, some MW jars from Giza were found sealed, indicating that they probably contained some sort of liquid. Two of them contained a fragrant resin of a coniferous tree (Reisner and Smith 1955:75), suggesting to Esse (1991:124) that the jars were routinely coated with pitch or resin to make them more suitable for storing liquids.

Bitumen has been found adhering to some pottery containers, mainly holemouths (see Chapter 9). However, most evidence derives from sherds that were likely to have been portions of vessels utilized for melting the material.

Other evidence for utilization of jars for transference of commodities during the EB Age is found in two ebony labels and two ivory inlays from tombs at Abydos showing 'Canaanites' (i.e. people of south Levantine visage/iconography) carrying so-called 'Canaanite' (i.e. EB I–II) jars (Amiran 1969b; Figure 10.5:1). The tombs are dated respectively to the reigns of Narmer and

Hor-Aha, i.e. to latest Dynasty 0 and earliest Dynasty 1.[11]

The two personages from the ivory inlays referred to above must be interpreted as Canaanites transporting the small jars with some commodities within. Of course we cannot identify the contents of the vessels and since the inlays are broken we cannot reconstruct the general composition and historical background in which the Canaanites are presented. In each one of the inlays a double line separates the Canaanites from other personages. In any case it seems that Canaanites are carrying and offering vessels as part of a general tribute (as suggested by de Miroschedji 1986:19–20) or a general operation of exchange with Egyptians.

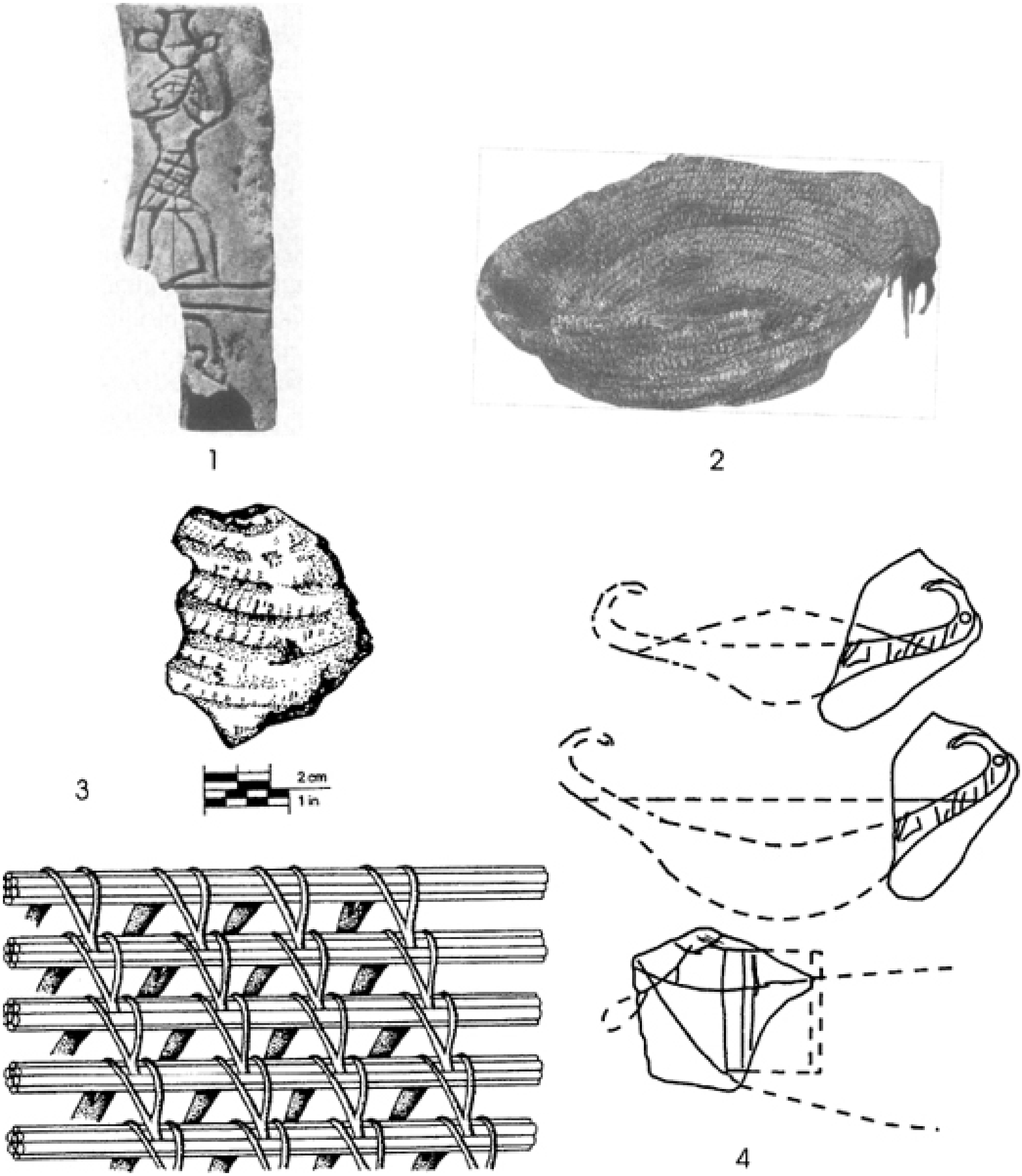


Figure 10.5 Containers and boats. 1. Ivory inlay from Abydos (after Amiran 1969b:Pl. 35:3, courtesy of the Israel Exploration Society). 2. Basket remains from the 'Cave of the Warrior' (after Schick 1998:Fig. 5:1). 3. Basket impression from Bab edh-Dhra and a schematic technique reconstruction (after Adovasio *et al.* 2003:Fig. 20.1). 4. Boat drawings incised on sherds, Megiddo (after Engberg and Shipton 1934:Figs. 10:G-H).

D. Pots as Containers

Evidence from the donkey figurines discussed above is not conclusive regarding the utilization of pots as containers in the animal's burden in EB Canaan. Most of the cases show an open and deep bag-shaped container. As Amiran

(1985:192) has noted, the vessels of Figure 10.3:1 have no good parallels in the pottery repertoire of the period. She suggested that they are probably imitations of baskets. For Figure 10.3:2 Amiran (1985:191) has suggested that these containers symbolize necked jars containing a costly liquid such as olive-oil. Figures 10.3:1,3,4, however, are more similar to holemouth jars. Necked jars had a capacity between *ca.* 25-110 liters. Holemouth jars had a capacity between *ca.* 20-70 liters, depending on the type of vessels. If we take into account that the donkeys of the Ashur caravans to Anatolia had two containers with a so-called *muttatum* ('halfpack') of about one talent each (*ca.* 35 kg) and one container called *elitum* ('toppack') of about half talent (*ca.* 17.5 kg) (Larsen 1967:149), it is probable that only small or medium holemouth or necked jars could serve as burden containers.

On the other hand, the containers could be also panniers made of a different organic material. Similar panniers are found in Cyprus, for instance, in a donkey model found in the Troodos mountains, an area rich in copper mining sites (Knapp 1992:58). This author has interpreted the model as a proof of the presence of the donkey as a means of transporting copper from the production centers to other sites that processed it within the island (*idem*).

Baskets

A second possibility is the utilization of bags or baskets carried by hand or loaded on donkeys. While we have no remains of leather bags (see below), there are a few remains of basketry from the Levant during the EB. Basketry is referred here following Adovasio and others (2003:599 with bibliography therein) as several kinds of items including rigid or semi-rigid baskets, matting and bags made by twining, coiling or plaiting.

These remains come from relatively dry areas such as the Cave of the Warrior, in Wadi Makukh (Schick 1998:26–7). The basket (Figure 10.5:2) could have an estimated volume of 18,000 cc, according to its reconstructed dimensions. The basket was made with the coiling technique and was reinforced by a leather string. Aside from this find, the fact is that leather is not preserved in the archaeological record. However this does not discard the possibility that other pack items were made of leather.

At Bab edh-Dhra two basket impressions of wall fragments (Figure 10.5:3) were found together with other weaving artifacts in the settlement, and dated generally to the EB IB–III.[12] Adovasio and others (*idem*, 621) attributed the use of flax (*Linum* sp.) to process fibers for basketry. Flax was found at Numeira, as well as at other sites such as Tel Abu al-Kharaz, Jericho, En Besor and Arad (see Chapter 7, Table 7.1).

Relevant for our research is the work by Stager (1990) on the relationship between the LPGW and basketry in Canaan (here Figure 3.13:5-10). He argues that LPGW imitated the basketry and matting of that time, which are a continuation of the Neolithic and Chalcolithic basketry techniques (e.g. Bar

Adon 1980:91; Schick 1988, 2002). Pottery vessels with sieve or twill patterns could be ceramic skeuomorphs for real baskets.

In this sense it is most probable that some of the containers found on donkey figurines represent real bags or baskets.[13] A representation of Canaanite donkeys in Egypt shows them with packs tied with a net and hanging to the sides of the beast as in the Beni Hasan paintings (*ca.* 2000 BC) (Figure 10.4:6). Ethnographic studies on the alabaster workshop in Sheikh Abed el-Gurna, Egypt focused on the production of alabaster vessels (see above), but also related to the transportation of the raw material to the workshop. In the description, the pre-forms of alabaster are burdened on donkeys with net-like carrying bags on the animal (Hester and Heizer 1981:P1. 1:2-3).

2. Discussion: The Cult of Donkeys and Exchange

A. The Domestication and Utilization of the Donkey

Frequencies of donkeys in relation to potential beasts of burden (i.e. cattle *vs* donkeys; Table 10.2) indicate a major difference between animal utilization in the Chalcolithic and EB IA periods that implies domestication of that beast in the latter period. It further indicates for the later period an important technical advantage in methods of transportation. These beasts of burden were capable of carrying appreciable loads over considerable distances for repeated journeys (see below) making transportation of heavy commodities considerably easier than it had been in former times. This development would have been a vital factor in the economy of EB societies. For instance, donkeys would have greatly facilitated transportation of copper and other materials from far away areas which were previously difficult to access. Thus, reduction of costs (i.e. outlay of labor and all that is involved) would provide easier access to commodities that formerly were rare and difficult to obtain.

Some ethnoarchaeological studies indicate the importance of the donkey as a beast of burden. A study of similar phenomena in pre-Columbian Mesoamerica shows that 'cargadores' (i.e. transporters of cargo) could only carry about 45 kg on their own (i.e. two lower and four upper grinding stones), but with the introduction of donkeys as beasts of burden they could transport greater loads on each trip, perhaps as much as two times what men could transport, for over much greater distances and far greater spans of time. According to documents concerning Assyrian caravans to Cappadocia in the second millennium BC, the standard weight carried by a donkey was *ca.* 75 kg (Larsen 1967:141–55). The study of the alabaster workshop at Sheikh Abed el-Gurna by Hester and Heizer (1981:36–7) indicated each donkey was loaded with two pieces of alabaster, each 30-35 kg, or with several chunks of the material that reached a maximum load of 80 kg.

The large numbers of equids at Afridar and at Bab edh-Dhra suggest that

these sites may have been associated with industries requiring extensive amounts of raw materials or, alternately, they were large stations associated with exchange networks. These data further suggest that donkey-based transportation in Canaan was conducted in the form of caravans, as described in sources of the Old Assyrian period for northern Mesopotamia and Anatolia (Larsen 1967) and pictorial representation at Beni Hasan, Egypt of a later period (MB II, *ca.* 1900 BC; Figure 10.4:6). Addition examples of such activity have been documented in ethnographic studies (e.g. Hester and Heizer 1981).[14]

High frequencies of donkeys at Afridar could also be related to the introduction of the domestic ass in the southern Levant from northeast Africa. As investigation of the archaeological record moves northward, the frequency of donkeys in relation to the total number of identified animals decreases. This is especially true for EB I but the same tendency is also visible in EB II and EB III (Table 10.1; Figure 10.2). This is also true if we consider the frequencies of donkeys in relation to potential burden beasts (Table 10.2). In both cases frequencies of donkeys are higher in the Coastal Plain and the Western Galilee than in the Jordan Valley.

Interestingly, sites in the Huleh Valley have not produced unequivocal remains of donkeys during the EB.[15] This may be due to the limited samples available for study and need not necessarily be an accurate picture of utilization of this beast of burden in that region. The authors of the faunal report on the EB Age occupation at Tel Dan (Wapnish and Hesse 1991:28–9) credit this lack of information to the limited exposure from which the data were obtained. Horwitz (2001:188), analyzing the faunal remains from Tel Teo, also considers the fact that limited areas were excavated from the EB and that the architectural remains unearthed were domestic structures. The EB II donkey figurines from Tel Dan suggest that donkeys were likely to have been used as beasts of burden in the Huleh Valley during the EB Age.

B. Iconography

The existence of numerous donkey figurines during the EB Age and the increase in faunal remains of *E. asinus* are interpreted as clear proof for domestication of the donkey. Such an important innovation, with its great advantages, must have had far-reaching social significance that eventually was simply rendered into artistic expression in the form of a particular iconographical motif, the donkey figurine.

The representation of animal figures laden with receptacles of different types is not an invention of the EB Age in the southern Levant but began earlier, although different animals were represented. Several Chalcolithic period sites in the southern Levant yielded laden figurines, mainly sheep and goats. At the En Gedi sanctuary a pottery figurine of a ram bearing on its back two churns was found (Ussishkin 1980), while at Gilat a ram bearing three cornets was found (Alon 1976:Pls. 33, 34). At Tel Turmus an incomplete basalt figurine

represents a ram with a bowl on its back (Epstein 1985:Fig. 2a, b), while a fragment of a pottery figurine found at Ghassul (North 1961:P1. 10) is probably similar to that from Ein Gedi.

Alon (1976), Amiran (1976) and Epstein (1985) have interpreted the animal figurines as vessels used in rites to promote fertility, like other types of figurines. The Chalcolithic figurines represent vessels used in milk product preparation (churns) and probably milk libation (cornets) and therefore it is not surprising to find these figurines in sanctuaries (En Gedi, Gilat). These vessels may have been used to promote fertility and success in sheep/goat-raising, as seems likely in the case of several miniature churns and figurines with churns probably found in Chalcolithic ritual contexts (e.g. Perrot 1961:Fig. 39:1, 3, Pl. 9:11, 14; Alon 1977:P1. 36; Milevski 2002).[16]

Notably, no donkey figurines were found in secure Chalcolithic contexts. As was mentioned above it is likely that the donkey figurine from Givatayim belongs to the EB burials at the site and not to those of the Chalcolithic period. While the churn and related figurines were dedicated to a cult of herd raising and milk production (Milevski, *idem*), the *Sitz im Leben* of the donkey figurines was the economic importance of these animals as means of transportation, and the probable social significance of being a tradesman or a person dedicated to exchange of commodities over short or long distance transactions.

Amiran (1985) was the first scholar to propose that donkey figurines represent a ritual offering in a tomb of EB merchants. She based her assertion on Chalcolithic parallels, figurines having ritual connotation and found in ritual contexts. The cultic aspect of donkey figurines is drawn from the fact that several of them were found in tombs. Actually all the figurines with a clear context were found in burials, i.e. Barkai, Givatayim, Azor and Jericho or as the case of Khirbet ez-Zeraqon, within the settlement.

We do not know what the relationship between the 'users' of figurines and their 'producers' was, with one exception claimed. The relation between the laden donkey figurines from Tel Dan (made of MW) and the jars of the EB II (also of MW) for long distance trade and exchange, both as containers and commodities themselves, has been pointed out by Greenberg (1996b; Greenberg and Porat 1996)[17] We do not know if this fact should be interpreted as a social relationship between traders and potters or whether MW material was chosen for aesthetic or quality reasons.

In addition, there is an evolution in the utilization of the donkey from a burden beast during the EB I–II to the riding of the donkeys during the EB II–III, as can be seen in the appearance of a saddle in several of the figurines and even a rider as in the case of the example from Khirbet ez-Zeraqon. Besides, from the beginning of the Canaanean MB II, artistic representations portray some supposedly high-ranking personages riding on donkeys, as in the Egyptian stelea of Serabit el-Kadem in southern Sinai (e.g. Gardiner and Peet 1952:Pls. XXXVII, XXXIX, LXXXV) (Staubli 1991:100–7).[18]

C. Ritual Practices

Regarding the cultic character of the figurines, we have some cases of donkey burials in Lod, Tel es-Sakan and Site H (Nahal Habesor). At `Ai, a donkey's jaw bone was found in a building identified as a sanctuary. The cult and sacrifice of donkeys is well known in the Ancient Near East. For instance, in Mesopotamia the sacrifice of a donkey was a form of signing an agreement, as analyzed by Finet (1993) and Anbar (1998),[19] with its Biblical parallels (see Scurlock 2002b:392; Borowski 2002:417). Donkey tombs were found in several sites in Mesopotamia (e.g. Clutton-Brock 1986, 1989; Clutton-Brock and Davies 1993) and Egypt as well (e.g. Petrie 1914; Clutton-Brock 1992).[20] At Tel Brak the donkeys were buried in a small temple in complex FS probably dedicated to the god Shakkan (Oates and Oates 1993:162–4).[21] This deity is though to have had a special relation with equids, defined as the cattle god since Enki entrusted animal life on the plains to that god in the story of 'Enki and the World Order' (Kramer 1961).[22]

The excavators have interpreted the complex as a caravanserai or way station based on the buried donkeys, and the references to equids on bullae found in the complex (Oates and Oates *idem*, Oates *et al.* 2001).

The cult of beasts of burden reminds us of cultic practices in the Andean region. In that area the beasts of burden are the llamas and other camelids. Ritual ceremonies of the herdsmen in the Andes are the *herranza* and the *mesa*, where people gather in a drinking feast and offer gifts, which, among other aims, are intended to protect the llamas and increase their number (Flannery, Marcus and Reynolds 1989).

The *mesa* is a ceremony related to ritual offerings (Flores Ochoa 1997). Actually, the word indicates the religious principle, the objects utilized in the ceremony and the shamans (*alto misayuq*) that participated. The mesa could refer to several questions. All of them include the invocation of the *wamani*, one of the supernatural owners of all animals, to protect the camelid livestock.[23] In several cases, the ceremony is related to the burial of a person and includes several personal objects such as pottery and other artifacts. In the case of the *llameros* (llama caravaneers) the ceremony includes llama and alpaca figurines which are included in the burial site, covered with textile sheets. Camelid figurines were found also in burial shrines in very high elevations as in Llullaillaco, Argentina (Reinhard and Ceruti 2000)(Figure 10.6:1-2). A different aspect of the cult of camelids in the Andean region is the existence of some sanctuaries devoted to these animals along the routes, such as that of Yuraj Cruz, Bolivia (Nielsen 1997–98) (Figure 10.6:3), where the caravans of llamas are depicted as rows of standing stones in front of the altar. Burials of camelids are also found in archaeological sites as in Wallatapampa, Peru together with camelid figurines.[24]

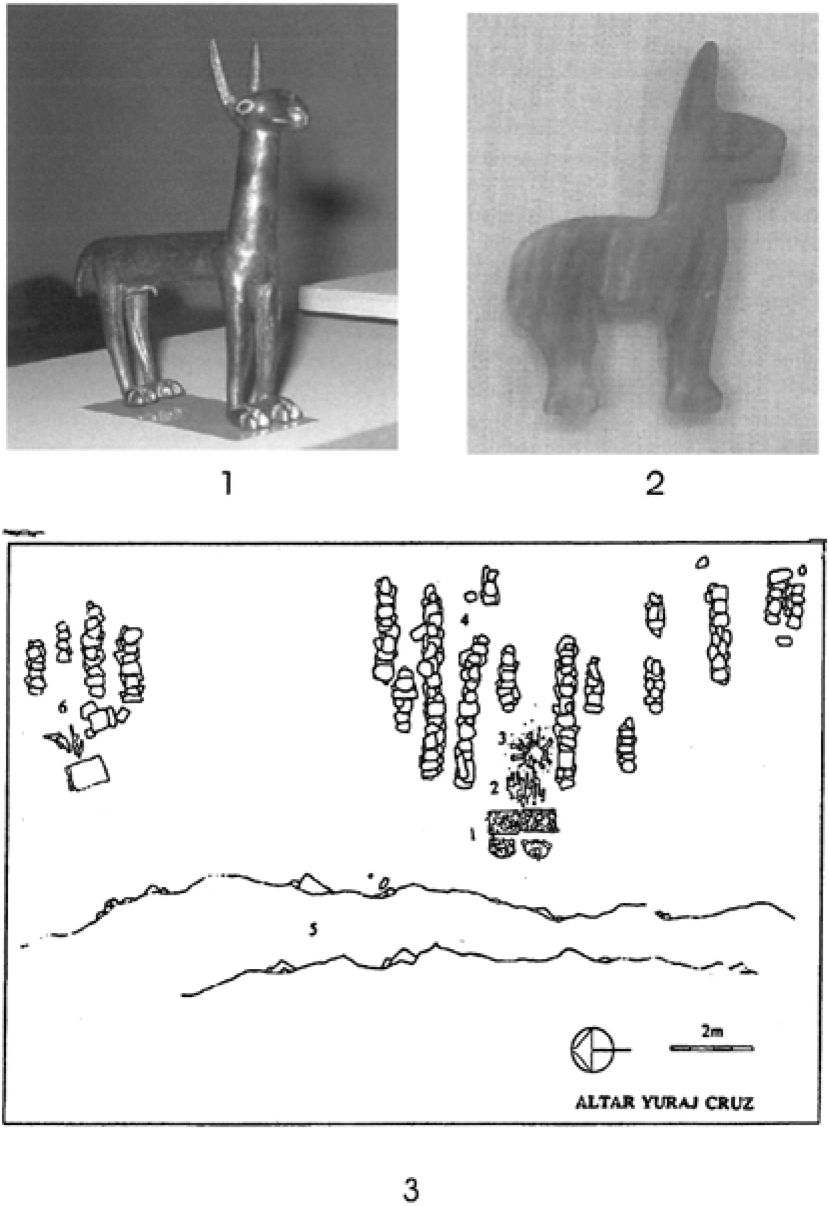


Figure 10.6 Camelid figurines and sanctuary from the Andean region. 1-2. Camelid figurines from Llullaillaco, Argentina (courtesy of Johan Reinhard). 3. Sanctuary of Yuraj Cruz, Bolivia (after Nielsen 1997–98). Number 1 represents the altar and numbers 4 and 6 represent caravans of camelids.

The dangers in the routes were always present. These risks and perils were augmented with the absence of military control along the ways, at least for the EB I. But even in cases where the authorities possessed some military units (as suggested by Yekutieli [2004] for the EB II–III) as in the case of Mari in the second millennium BC, the robbery of donkey caravans was frequent (Joannès

1996:331). However, we do not have to exaggerate the weight of the thefts because sometimes the documents have political connotations that reveal ethnic abhorrence against nomads, mountainous population, etc. (e.g. Foster 2002:285–6).

Of course, military activities could also interfere in the transportation along the routes when wars or simple battles existed (Joannès 1996:332). Besides, natural obstacles existed, such as the severe weather conditions in the semi-desert and desert regions. The Egyptian literature registered these cases in some narratives like the 'The Protests of the Eloquent Peasant,' where the donkeys and transported goods of the itinerant Khuanup were robbed in his way (Wilson 1955:407–10), and the 'Satire of the Trades' where the itinerant merchant was 'slain' by the gnats and the sand flies made him 'miserably miserable' (Wilson 1955:432). All these circumstances naturally influenced the merchants to search for the protection of the deities for them and their livestock in the routes of the country. We suggest an interpretation of the donkey figurines found in burial contexts similar to that of the camelid figurines found in burial contexts in the Andean region, against the background of ritual ceremonies including the worshiping of the burden animals as symbol of transportation.

Despite the fact that we have no knowledge of deities related to transportation and exchange during the EB in the southern Levant, we are acquainted with a few references to probable deities in the local EB (e.g. Amiran 1972a, b; see above bull ivory heads in Chapter 8). Furthermore, there are additional references to deities related to trade and exchange in the Ancient Near East.

Of relevance is the work of Brody (1998) who has exemplified the cult of Canaanite and Phoenician seafarers, i.e., the cult of a particular type of merchant whose means of transportation was across the sea. Among others, these sailors worshipped marine deities and protector gods and goddesses (Brody 1998:22–37). Sanctuaries near the coast, a sacred space consecrated within the ships, and religious ceremonies characterize this worship (Brody 1998:39–94).

One of the deities, Milqart was probably assigned as a protector of trade and exchange, not only of seafarers. Milqart was associated with the Greek Herakles, considered a guardian of the voyagers (Lacroix 1974). Herakles/Milqart were the parallels for Human Irshappa, who is also identified with the Canaanite Reshep (Vattioni 1965; Fulco 1976, Laroche 1976:124–5; Cornelius 1994), Ugaritic *eršp* (Schaeffer 1968:521) and Mesopotamiam Nergal (Albright 1968:128, 145, 243; Lambert 1973; Brody 1998:37, 98).[25]

Most relevant are the references to a deity associated with trade and exchange appearing in two texts from Bogazkoy, where Irshappa appears as the 'god of the merchant' (*tamgar-(š) še*) (Brandenstein 1934:Vs. II 23; Ehelolf 1944:102 II 13; Boehmer 1979: XXVII:I rev. ii 23; XXXIV:102 ii 13).[26] Nergal (the Mesopotamian equivalent for Reshep and Milqart) is also referred to as the

'lord of commerce' or 'lord of the market place' in one of the texts of Emar (Arnaud 1986:373, 378).

Other god related to trade or transportation is Min from Egypt, the deity of Coptos. In one of his characters he is related to the protection of voyagers and explorers, and indirectly with traders. In a late text (Yoyotte 1952), Min appears as the explorer of the oriental deserts connecting Coptos to several mineral sources near the Red Sea.[27]

In summary, we suggest that the sociological background for the donkey figurines is the existence of a group of merchants or donkey caravaneers, existing from the EB I onwards, who specialized in the transportation of commodities and derived benefits from their knowledge of the management of the domesticated donkey. Interestingly, we have evidence for the existence of such a group or guild, as some authors have labeled them (e.g. Mendelsohn 1940). The Talmudic literature reflects the existence in Roman Palestine of a special group labeled the ass-drivers who 'are entitled to stipulate that if one loses his ass he should be provided with another ass' (*Tosefta Baba Mesi'a*, XI, 25–26), i.e., the members of the guild or group who were insured against the loss of their labor tool. Certainly it is not the intention here to present parallels with the guilds or artisan groups of the Roman period, a period characterized by a different mode of production based on monetary trade, free and slave labour, classical cities and artisan organizations absent in the EB Age.

It appears that during the EB Age, the donkey drivers practiced a special ritual or ceremony related to the donkey as a means of transportation; the clearly identifiable evidence for this ritual is the figurines found in the human burials and the burial of these equids in certain places. As we do not have evidence of special deities related to trade and transportation in Canaan, it is difficult to associate a particular god to these supposed ceremonies, and we can only theorize that the Levantine Resheph was the most probable candidate for this task, or a local variant of the Mesopotamian Shakkan.

Alternatively it is suggested that the donkey figurines could have been ceremonial, supernatural protectors of livestock, as in the case of the *wamani* of the Andean world. As donkey figurines with saddles and riders appear also in Levantine cultic contexts from EB II onwards, it is probable that they were intended to emphasize the general character of the donkey as a means of transportation with which donkey herders were involved.

Notes

1. For the method of radioimmunoassay (RIA) in order to distinguish between different taxa of equids see Gilbert, Lowenstein and Hesse 1990. Unfortunately we do not know of any results of RIA applied to equids in our region.

2. Diffusion of donkeys to other sites and regions, as they were used for long distance travel, may be reflected in the archaeological record as Ovadia (1992:20) has pointed

out, but there are still problems both in the definition of the faunal remains and the statistical data.

3. No remains of equids were found in the Chalcolithic stratum VI, nor in the other EB IA and EB II–III strata (V, IV, II and I).

4. Zeuner (1963, quoted by Clutton-Brock 1979:145) and Grosvenor Ellis (1960), believed that most of the remains belong to *E. hemionus.*

5. For a previous report on the faunal remains of Tel Dalit see Hellwing and Gophna 1984.

6. Figurines of such type also continued to appear albeit with different beasts of burden, and produced by techniques and in different styles, in much later periods (e.g. Ben-Arieh 2004:23; Figs. 2.56:61, 2.57:61).

7. For the first season see Braun 1996a, who notes a similarity between the object and one from Tel Dan (Greenberg 1996b:Fig. 3.38:11).

8. For abreviations on pottery wares in Parts III and IV see Chapter 3.

9. It was dated to the Chalcolithic (Epstein 1985) on the basis of Chalcolithic pottery in the cave. Nearby caves (Sussman and Ben-Aieh 1966) yielded Chalcolithic and EB I pottery and other finds. On the basis of iconographic similarities to EB Age donkey figurines, the Givatayim figurine should also be dated to the EB Age, indicating that the cave where it was found was probably reutilized during EB I.

10. For collared-rim pithoi of the LB/ Iron Age I as containers see Artzy 1994 and Wengrow 1996; for an opposing view see Cohen-Weinberger and Wolff 2001:654.

11. The vessels represented on the wooden labels and ivory inlays were interpreted by Petrie (1901:19–22) as of stone and the persons depicted as Lubians. However, Amiran's (*idem*) comparative study seems to present a more likely interpretation. She judged the representations of this pottery to be of similar morphology to types she found at EB I sites, and the iconography of the people represented as more fitting of Asiatic prisoners. However, in this writer's opinion, at least one of the jars could be EB II in date. Perhaps corroborative evidence for this type of utilization of jars for transport may be derived by analogy from a stele from Serabit el-Khadem dated to the reign of Amenemhet III (1844–1794 BC). It shows a person in the lower register, probably an Asiatic ruler on a donkey conducted by a servant. Behind him is a person carrying a jar in his left hand in a position similar to that of the man in one of the ivory inlays noted above (from Figure 10.5:1; Staubli 1991:Abb. 16). The vessel seems to have the characteristics of an MB IIA storage jar with flattened base (e.g. Amiran 1969a:Pl. 31:4) suggesting a south Levantine origin.

12. Mat fragments were found in the EB IA tombs at the site (Luffman Yedlowski and Adovasio 1989:531, Fig. 302).

13. For instance, today's donkeys in Ireland are loaded with the help of large baskets (Clutton-Brock 1992:Fig. 4.12).

14. And see also ethnographic descriptions of caravans of 120 donkeys among the ! Kung from South Africa (Lee 1980:403–4).

15. There is a remote possibility that the one bone from an *E. asinus* found at Tel Na'ama in an IBA context has mixed material from the EB II at site (Greenberg *et al.* 1998:29).

16. Amiran (1976) has even suggested that these figurines must be related to a Dumuzi-like myth and cult, since this deity is related *inter alia* to the 'power in the milk'.

17. In other cases cases we have no petrographic description of the figurines. At Arad, for instance, the description of the clay from Stratum I seems to fit that of the necked jars (Glass 1978a).

18. Another representation of donkeys occurs in a probable IBA context (*ca.* 2200–2000 BC) in a rock engraving near `Ain el Gudeirat in the Negev (Haiman 1996:21, Fig. 15).

19. I am indebted to Jorge Silva Castillo, El Colegio de Mexico, for this reference.

20. The bones of the donkeys have been radiocarbon dated according to 4390 ± 130 BP, i.e. parallel to the Canaanean EB IB.

21. The temple is dated to *ca.* 2200 BC, i.e. the IBA (EB IV) in Canaan.

22. See Scurlock 2002a:385.

23. One of these ceremonies in the region of Ayacucho (Peru) was described by Flannery, Marcus and Reynolds (1989:151–82). One of the herders is depicted staying in a rocky peak believing that the *wamani* related to his terrain lived there and the caves are the entry and exit for this *señor de los animales* (lord of the animals) (Flannery, Marcus and Reynolds 1989:154). A song from the time of the Incas (a Situa hymn) also addresses the appeal of the herders to the gods, in this case Viracocha, to protect their flocks as well as the agricultural produce (Brotherson 1989:247): *Let me live in peace/and safety,/Father Viracocha/food and sustenance/maize and llamas,/with all manner/of skills.*

24. Instituto Nacional de Cultura Cusco, Peru, http://www.inc-cusco.gob.pe/webPAS/PIAS/Proy5/Default.aspx#_hl.

25. It is surprising that at Ugarit, in spite of the quantity of documents related to trade and exchange (e.g. Rainey 1963; Heltzer 1977, 1978) no deity is related to this activity. The only Ugaritic deity associated with a particular economic profession is Kotar wa-Hasis, a craftsman god, comparable with the Hephaistos of the Greeks (Smith 1985, Barré 1983: 85–6).

26. Moran 1992:102, n.4; Haas 1994:369–70; Brody 1998:37, and bibliography therein.

27. See the probable connections of Min with Reshep (Shoemaker 2001). Other deities like Hathor and Maat are destined to the protection of the mines of lapis lazuli and turquoise in Sinai (cf. Aufrère 1997:125–6, 132–3).

11

Exchange Networks

In Part II, different kinds of goods were discussed with a view to their sources, most likely centers of production, and patterns of exchange as understood from archaeological finds that indicate their dispersal over distances. Those last observations, although obviously incomplete, are the only and consequently the best sources for understanding routes and patterns of exchange in this bygone period.

While most of the commodities presented in this research are utilitarian goods, a few may be classified as either valuables or luxury items. These last include a handful of ivory objects, shells and fragments of shells and tiny carnelian beads (see Chapter 12, Section 3). The present section defines the areas in which commodities were exchanged and their likely centers of distribution. The routes these objects traveled are reconstructed from patterns of distribution of commodities. Since regional divisions proposed by Gophna in his main works (e.g. Gophna 1974, 1984; Broshi and Gophna 1984; Gophna and Portugali 1988; Gophna 1995b; Getzov, Paz and Gophna 2001) best characterize the southern Levant, the discussion follows the lead of these scholars by treating the evidence in the same way. Figures 11.1–8 visually present these results.

While synthesizing the data described in the previous chapters (i.e., the characteristics of exchange networks of the EB Age in the southern Levant), this research outlines some parameters for exchange proposed by Plog (1977:128–9). Results of this research suggest that there was no economic centralization in this period, but rather a number of independent production and exchange networks.

Unlike traditional theories of networks (cf. Plog, *idem*) that understood the different components of an exchange network as a fixed formal structure, it is suggested here that the the networks should be understood as a reflection of

economic relations (in the archaeological record) between manufacturers and consumers (cf. Marx 1970:195–205), within a given territory. Although these networks are far from having the characteristics of 'markets' as in modern capitalist economies, it is within the exchange network that producers' surpluses were realized.

1. Northern Regions

A. Upper Galilee

Upper Galilee is poorly represented in the data base of sites that participated in EB exchange. However, a modicum of information is available for the region. It is likely that during EB IA Upper Galilee sites received GBW from sources in Western Galilee and the Huleh Valley, indicating that goods were exchanged or circulated along an east to west axis. Information on exchange in EB II comes from only three sites, Meona, Tel Qedesh and Tell Ruweisa, all recipients of MW. During EB III, KKW, probably originating at Hazor, reached Western Galilee, suggesting that Upper Galilee was the region through which KKW crossed to northern coastal sites such as Rosh Haniqra (Western Galilee).

The actual routes are not always evident because of the few relevant finds from this period. Nevertheless, it may be assumed that such natural routes as Nahal Betzet, Nahal Keziv, Nahal Hilazon and other easily traveled *wadis* were the byways through which these commodities circulated. There is some suggestion that the area of Gush Halav was the locale of a Canaanean blade workshop (during the EB II?). If that interpretation is correct, then it may well have supplied sites in the region, and the routes would have been similar. Beachrock tools from the northern Coastal Plain found at Hazor must have also been brought through the *wadis* of Upper Galilee.

B. Huleh Valley

The Huleh Valley was a north-south axis of distribution which showed signs of significant activity during EB IA in the exchange of the locally produced GBW Family-Ie. The Jordan River Valley was apparently the principal recipient of goods of this family, but there is also evidence of exchange between the Huleh Valley and Western Galilee, as determined by some exemplars of GBW, Family-If. This indicates exchange along a north-south axis as well as an eastern-western axis through Upper Galilee. The Huleh Valley was also active during EB II when MW was widely distributed, especially at the urban settlements of Tel Dan and Tel Hazor. Notably, those sites are also known to be centers of production and distribution of KKW in middle EB III. Indeed, these sites were two of the most important centers of the EB II and III in Canaan, and their location at the intersection of routes to the northern Levant and the

westernmost regions of Galilee must have played a key role in their development (cf. Greenberg 1996a, 2002). From the appearance of donkey figurines at Tel Dan, Meona and Qiryat Ata, all from EB II contexts, it is possible to conjecture the existence of a relatively developed group of merchants utilizing the donkey as a beast of burden, although zoological data are very meager on this matter (see above).

The fact that metal weapons, probably originating in the Feinan region, in the eastern Aravah, made their way to the Huleh Valley (Hazor and Tel Dan), is an important aspect of interregional exchange using the Jordan Valley as one of the main lines of circulation, with probable outposts or way-stations at Jericho and Beth Yerah (see below). Tel Gadot is the northernmost site where carnelian beads were found; considering their southern origins we can also explain the northern location of this raw material by the fact that the Huleh Valley is a continuation of the Jordan Valley, a main thoroughfare for exchange.

Northern regions, EB I.

Sites. See opposite page.

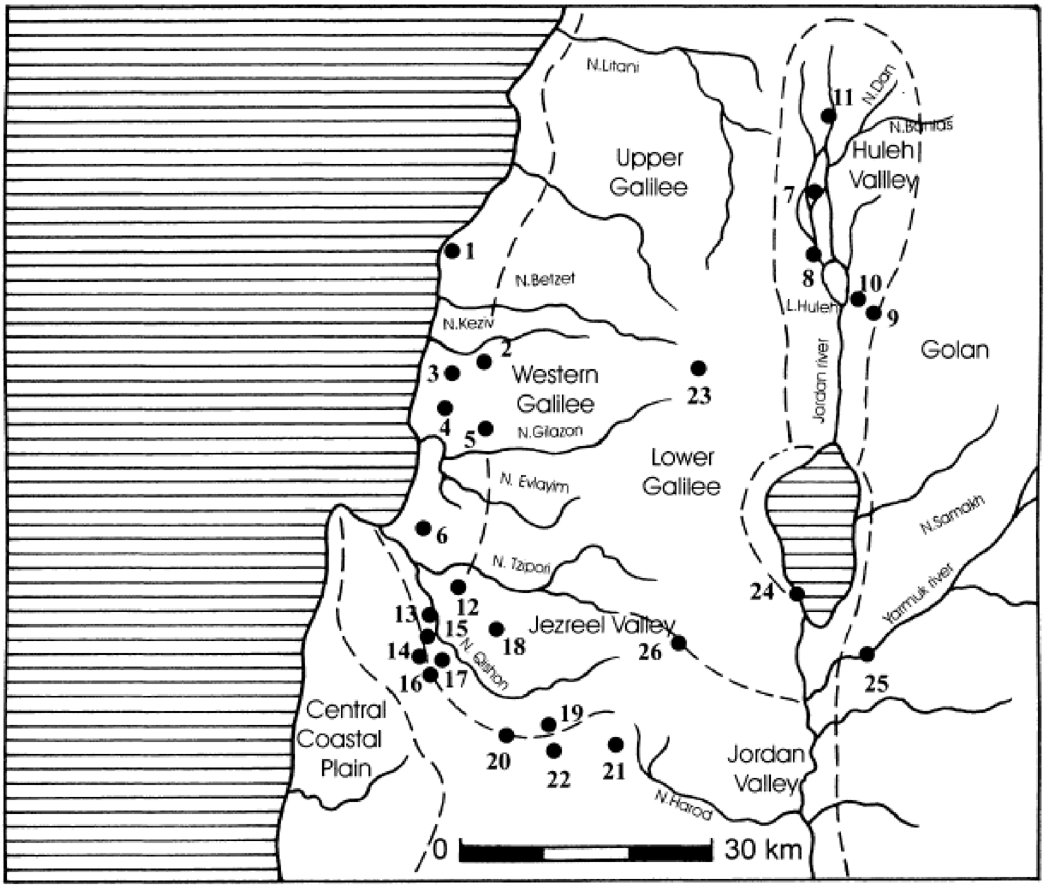


Figure 11.1 Northern regions, EB I.

Northern Regions, EB I.

Commodities / Sites	Gray Burnished Ware I-II	Gray Burnished Ware III-IV	Crackled Ware	Umm Hammad Ware	Erani C	Dolomitic Wares	Grain Wash	Tel Aphek Bowls	Canaan. Cores	Canaan. blades	Tabular scrapers	Sourced Basalt
1. R.Haniqra	+											
2. A. Dhahab							+			+		
3. Kabri	+	+					+			+		
4. B. Haemeq	+	+					+			+	+	
5. K.Uzza	+									+		
6. Q. Ata		+					+			+	+	+
7. T. Na'ama	+									+	+	
8. T. Teo	+	+								+	+	
9. Gadot	+											
10. Y. Hamaaleh	+											
11. T. Hatzatz	+											
12. Yiftahel	+											
13. T. Qashish		+					+	+		+	+	
14. T.Qiri	+	+										
15. A. Zureiq	+											
16. H. Haruvim									+	+		
17. Hazorea		+										
18. E. Shadud		+	+				+			+		
19. Affula	+	+	+		+					+	+	
20. Megiddo	+	+	+							+	+	
21. T. Jezreel	+											
22. G. Yonatan				+								
23. N.G. Halav									+(?)			
24. B. Yerah			+							+	+	
25. P. Hayarmuk												
26. T. Qishyon						+(?)						

Commodities / Sites	Beach-rock	Metall. remains	Metal objects	Grain	Olive & grapes	Trees	Pulses	Med. species	Red Sea species	Nilotic species	Donkey remains	Donkey figurines	Camel
1. R.Haniqra			+										
2. A. Dhahab													
3. Kabri					+					+			+
4. B. Haemeq											+		
5. K.Uzza													
6. Q. Ata			+					+	+		+		
7. T. Na'ama													
8. T. Teo													
9. Gadot													+
10. Y. Hamaaleh													
11. T. Hatzatz													
12. Yiftahel		+	+					+			+		
13. T. Qashish	+			+	+	+	+	+	+				
14. T.Qiri													
15. A. Zureiq													
16. H. Haruvim													
17. Hazorea													
18. E. Shadud											+		
19. Affula													
20. Megiddo					+	+				+	+(?)		+
21. T. Jezreel													
22. G. Yonatan													
23. N.G. Halav													
24. B. Yerah			+										
25. P. Hayarmuk												+	
26. T. Qishyon												+	

Northern regions, EB II.

Sites. See opposite page.

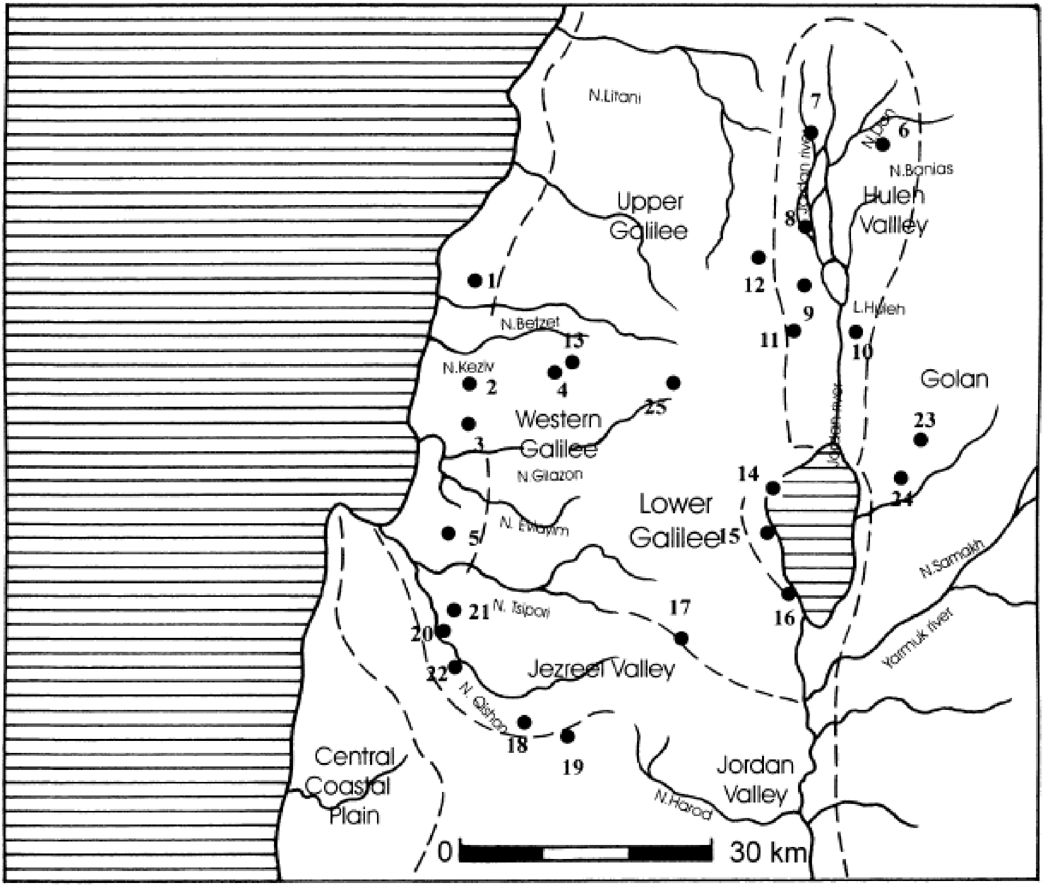


Figure 11.2 Northern regions, EB II.

Northern Regions, EB II.

Sites / Commodities	Metallic Ware	Tel Aphek Bowls	Canaan. Cores	Canaan. blades	Tabular scrapers	Beach-rock	Sand-stone	Metall. remains	Metal objects	Grain	Olive & grapes	Trees	Med. species	Red Sea species	Donkey remains	Donkey figurines	Hippo remains	Camel.
1. R. Haniqra	+								+									
2. Kabri	+			+							+		+		+			
3. B. Haemeq	+																	
4. Meona	+			+	+											+		
5. Q. Ata	+			+	+				+(?)				+	+	+	+		+
6. T. Dan	+			+	+				+							+		
7. T.A.B. Ma'acah	+																	
8. T. Na'ama	+			+											+			
9. T. Teo	+			+	+													
10. Gadot	+																	
11. Hazor	+					+												
12. Qedesh	+																	
13. T. Rweisa	+																	
14. T. Kinrot	+																	
15. T. Reqet	+																	
16. B. Yerah	+			+	+				+								+(?)	+
17. T. Qishyon	+																	
18. Megiddo	+																	
19. T. Taanakh	+																	
20. Yoqneam	+																	
21. T. Qashish	+	+				+				+	+	+	+	+				
22. H. Haruvim	+		+	+														
23. Gamla	+			+	+													
24. Leviah	+																	
25. N.G. Halav			+															

Northern regions, EB III.

Sites. See opposite page.

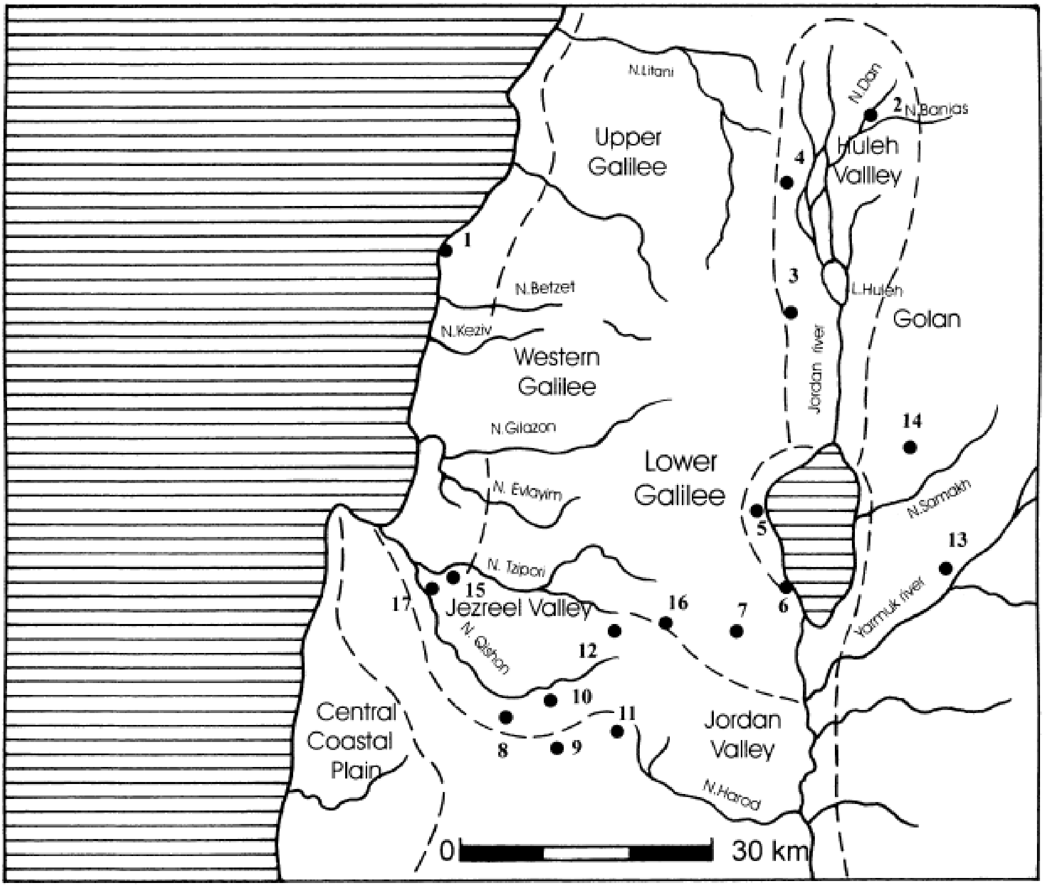


Figure 11.3 Northern regions, EB III.

Northern Regions, EB III

Sites \ Commodities	Khirbet Kerak Ware	Canaan. blades	Beach-rock	Metal objects	Grain	Olive & grapes	Trees	Pulses	Med. species	Donkey remains	Hippo remains	Ivory
1. R. Haniqra	+											
2. T. Dan	+											
3. Hazor	+		+(?)	+								
4. Qedesh	+											
5. T. Reqet	+											
6. B. Yerah	+	+		+							+	+
7. T. Rechesh	+											
8. Megiddo	+					+	+					
9. T. Taanakh	+				+	+		+				
10. Affula	+											
11. E. Jezreel	+											
12. K. Safsafa	+											
13. T. el-Fakhat	+											
14. M. Leviah	+											
15. T. Regev	+											
16. T. Qishyon	+											
17. T. Qashish					+	+	+		+	+		

C. Golan Heights

This study has dealt with the Golan plateau in a very limited manner since little information on excavations is published, and the extensive survey conducted by the IAA is still unpublished. The Golan was dependent for several aspects of pottery consumption on other northern locales during EB II and III, but probably this region had its own sources for some flint tools and ground stone tools. Sites such as Gamla probably acquired Canaanean blades from other western and southern regions. The donkey figurine found at Pithat Hayarmuk (EB I) on the northern bank of the Yarmuk River Gorge, a main route at the southern border of the Golan plateau, is surely a representative of the cult of transportation described above.

D. Western Galilee

Western Galilee, also called the Northern Coastal Plain apparently participated in the production, distribution and acquisition of the GBW (Family If and Families Ia, Ie and III respectively) in EB IA and EB IB. This region also probably produced at least some of the beach-rock tools found in other northern, inland regions. During EB IA, and to some extent during EB IB, a significant exchange developed between Western Galilee, and the Jezreel and Huleh Valleys.

Some commodities such as basalt and metal tools made their way to Western Galilee from greater distances such as Wadi Arab and probably Wadi Feinan in Transjordan. During EB I and II shells arrived both from nearby Mediterranean shores and the Red Sea. Kabri is the northernmost site where Nilotic mother-of-pearl has been found to date. Western Galilee shares with other northern regions a wide distribution of MW types during EB II. In EB III, KKW reached as

far as Rosh Haniqra. The same site also yielded metal tools, apparently derived from the eastern Aravah. Qiryat Ata and Kabri probably were two centers of redistribution along the northern coastal route. The former site, located near the Jezreel Valley, linked the valley with the northernmost centers in northern Canaan and the Northern Levant along the Mediterranean littoral.

E. Lower Galilee

Lower Galilee is one of the main protagonists in the production and exchange of GBW in the EB IA. Yiftahel and the Bet Netofa Valley are candidates for centers of production of two variants of Family I. This area connects Lower Galilee with almost all the northern and central regions of the country.

The area of the Sea of Galilee, part of the Great Rift Valley, participated in the exchange of pottery from the EB I to the EB III with GBW, CW, MW and KKW. These wares show connections mainly with the Jezreel and the Beth Shean Valleys. Maritime exchange across the lake (see below), with the Golan may only be hypothesized; land routes (especially along the southern and eastern shores and via the Yarmuk Gorge) could have been alternate routes to the probable maritime routes leading to the Golan Heights. The area around the lake is an obligatory route for commodities coming from the south to sites in the Huleh Valley; that is apparently the reason why metal objects originating in the Feinan area are found there. Bet Yerah was the main center of population and most likely benefited from its location at the intersection of several routes and regions (cf. Esse 1991:100-101).

To what extent agricultural exchange existed is difficult to say, since data on crops in the northern region are few. However, it should be stressed that the granary at EB II–III Beth Yerah which, according to Kempinski (1979:29), could have held 800 tons, indicates considerable accumulation of foodstuffs, some of which were probably surpluses used for exchange. If hippopotamus remains imply herding or utilization for production of ivory items, then Bet Yerah may have been a center of production of the ivory bull's heads found at more southerly EB II–III urban centers.

F. Jezreel Valley

The Jezreel Valley is a good example of a region that is in itself a route of exchange. It connects the Jordan Valley with the Central and Northern Coastal Plains. The connection with the Jordan Valley is made through Nahal Harod and the Bet Shean Valley. The connection with the northern coastal plain is made through the Qishon pass, and with the central coastal plain through Wadi Ara (Nahal Iron).

The Jezreel Valley appears to have been the core area where GBW was most plentiful during EB IA and EB IB (Affula), and the likely location of at least one of its centers of production. Some pottery wares from the Jordan Valley, the

Central Coastal Plain and even the Shephelah also reached several sites in the Jezreel Valley. The Jezreel Valley contains the most outstanding evidence in the southern Levant for a workshop producing Canaanean blades at Har Haruvim. Though still unexcavated, the site has produced a plentiful supply of cores found in surface surveys. Exchanged goods found at Megiddo include Egyptian objects as well, such as mother-of-pearl shells and Egyptianized pottery.

The Jezreel Valley, rich in EB sites including Megiddo, one of the largest or perhaps the very largest EB I site in the region.[1] Megiddo was a major center in EB III that could control production workshops of the nearby sites. Imported and exotic finds from the site suggest that it was large enough to have produced surpluses that could be exchanged. Its population would have needed food supplies that might have been obtained from smaller, satellite settlements of the sort found at Tel Qashish. Excavations at that site yielded evidence for several kinds of crops as well as Mediterranean shells and fish and Red Sea shells. Containing GBW and MW during the EB IB and II like most of the sites in the region, Tel Qashish is strangely the only important site in the Jezreel Valley without KKW (cf. one of the possible explanations in Zuckerman 1996a).

2. Central Regions

A. Jordan Valley

The Jordan Valley, part of the Great Rift Valley, a fertile region filled with sites and a natural road, may be called the backbone of exchange between north and south Canaan. Evidence of exchange is found in patterns of circulation of different types of pottery. Connections to the north are found in the presence of GBW, MW and KKW. Central pottery groups such as EC forms, Dolomitic LPGW, and TAB of the EB IB–II are also frequently encountered at Jordan Valley sites, both west and east of the Jordan River. In addition, some southern wares, albeit in minute quantities, made their way to the region.

Local wares of EB I circulated at Jordan Valley sites (SDS, UHW) but also made their way as far away as the Central Hill Country and the Jezreel Valley. Bitumen and metal objects circulated to the north, as apparently did some basalt tools originating in the outcrops to the east of the Dead Sea and Red Sea shells coming up through the Aravah. If carnelian beads originated in the Negev (see below), then it is reasonable to suggest that the Jordan Valley was also part of the trajectory by which they were distributed to sites in the Bet Shean area and the Huleh Valley.

Jericho, at the southern end of the Jordan Valley, could also have been a source of hippopotamus ivory and possibly the production focus of bulls' heads. Without doubt, Jericho was the main center in the Jordan Valley, controlling exchange that passed through the valley from all directions. Surely

interregional exchange favored economic development, as has been suggested by Anati (1962). Equid remains and donkey figurines stand against the background of the exchange and ritual activities related to Jericho. In addition, Jericho was probably a locale for a religious center (for the Moon cult?) together with Bet Yerah (Hebrew 'House of the Moon'), on the basis of the linguistic root of the word Jericho, related to the moon (Hebrew ירח) (Brown, Driver and Briggs 1978:698; cf. Albright 1946:83).[2] Both cities were located at the center of the Rift Valley and participated in the exchange through this natural route.

B. Central Hill Country and Shephelah

The Central Hill Country has been represented in this study in a limited way because of the limited number of sites and the limited available data on exchanged commodities. The picture that has presently emerged from studying patterns of exchange there indicates that the whole region took part in exchange in a passive way. This is deduced from evidence of restricted locally produced commodities of the region against the 'imports' from other regions, aside from some pottery groups, crops and wood probably 'exported' from the Hebron hills to the Northern Negev. Local pottery groups include GBW Family II during EB IA, which originated in the Samarian hills near Nablus, and Dolomitic wares of the EB IB, which spread to the Jordan Valley, the Northern Negev and the Dead Sea Plain. EC and TAB arrived at central and northern sites during EB IB–II. A few examples of MW and KKW as well are attributed to EB II–III contexts. Flint tools, metal objects, Mediterranean and Nilotic shells, and bitumen were also found in the region. Tel el-Farah (N) and 'Ai (in the Ramallah area) were the most important centers and in the region. To date, they have yielded, the greatest concentrations of exchanged goods. Hebron may also have been a center of exchange for the southern regions during EB III, if a metal hoard retrieved from looting of the site is any indication of activity there.

Central and southern regions, EB I.

Sites. See opposite page.

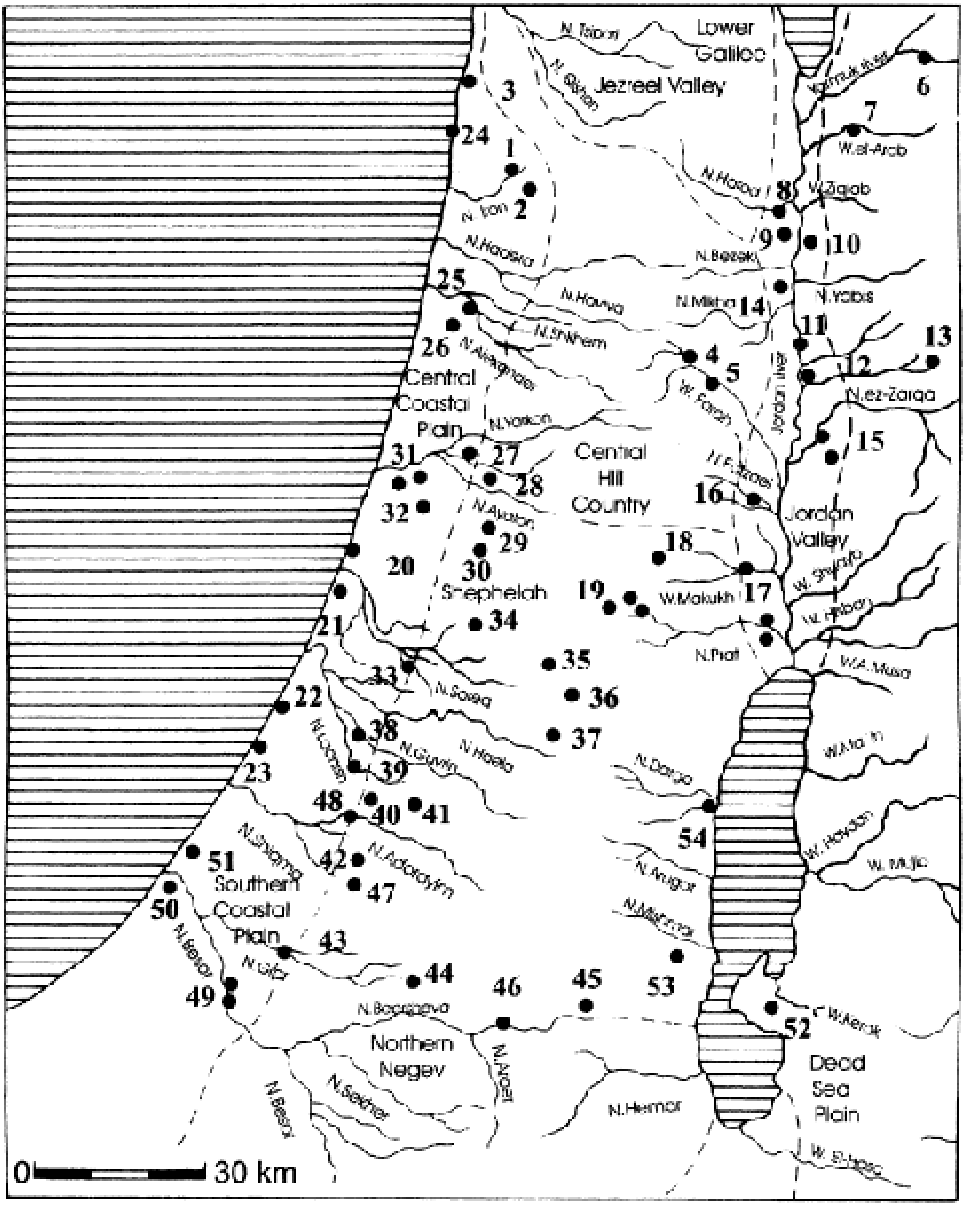


Figure 11.4 Central and southern regions, EB I.

Central and Southern Regions, EB I

Commodities / Sites	Gray Burnished Ware I-II	Gray Burnished Ware III-IV	Splash & Drip Painting	Crackled Ware	Umm Hammad Ware	Erani C	Dolomitic Wares	Grain Wash	Tel Aphek Bowls	Canaan Cores	Canaan. blades	Tabular scrapers	Basalt	Beach-rock / kurkar	Sand-stone	Metall. remains	Metal objects	Olive & grapes	Trees	Pulses	Med. species	Red Sea species	Nilotic species	Donkey remains	Donkey figurines	Bitum.	Camel.
1. E. Assawir (1)	+	+								+	+	+		+									+		+		
2. Metzer	+																+										
3. T. Megadim		+						+			+	+															
4. T. el-Farah N.	+	+			+				+		+	+									+	+					
5. Aqrabaniyeh	+	+																									
6. A. edh-Dhar	+			+																							
7. T. esh-Shuneh	+	+	+		+								+			+	+							+(?)			
8. B. Shean	+				+				+		+	+					+									+	
9. E. Haratziv				+																							+
10. Pella				+				+																+(?)			
11. T. es-Saidyeh			+																								
12. Ruweiha					+																						
13. A. al-Kharaz			+															+		+							
14. T. Shalem		+						+			+																
15. T. U. Hammad	+		+		+						+																
16. Fatzael										+	+																
17. Jericho (2)	+	+			+	+	+		+		+	+					+	+	+	+	+	+				+	+
18. 'Ai		+			+	+	+										+				+						
19. Jerusalem (3)	+			+		+	+				+	+					+	+			+	+					
20. B. Yam																									+ (?)		
21. Palmahim	+										+			+		+	+				+		+			+	
22. Nizzanim											+						+	+	+							+	
23. Afridar	+ (?)					+				+	+	+	+	+		+	+	+			+	+	+	+		+	
24. Atlit bay																						+					
25. N. Alexander																	+										
26. K. Menash																	+										+
27. T. Aphek						+		+	+		+																
28. T. Dalit								+	+		+							+								+	+
29. Shoham			+(?)						+		+													+		+	
30. Lod									+															+	+	+	
31. T. Aviv (4)																	+				+	+					+
32. Azor						+	+				+										+		+	+	+		
33. Gezer			+(?)			+	+			+	+																
34. T. es-Safi									+																		
35. Hartuv						+					+																
36. L. H. Ilin (5)										+	+	+			+		+	+					+			+	
37. T. Yarmuth (6)											+																
38. G. Guvrin						+				+	+	+															
39. T. Erani						+	+				+	+	+				+	+					+			+	
40. H. Ptora						+				+	+	+		+			+				+		+			+	
41. Lachish						+		+			+	+		+		+		+(?)	+(?)	+(?)		+(?)				+	+
42. T. Nagila							+																				
43. T. Sera										+(?)																	
44. T. Halif							+				+	+	+					+						+		+	
45. Arad							+				+	+				+	+	+			+		+	+		+	
46. S. T. Malhata							+						+			+	+									+	
47. T. Mahaz							+																				
48. T. el-Hesi							+ (?)																				
49. N. Besor (7)						+	+				+	+				+	+						+	+		+	
50. T. Ikhbeine							+				+	+									+		+	+			
51. T. es-Sakan																								+			
52. B. edh-Dhra							+				+	+	+					+(?)	+(?)	+(?)		+				+	+
53. N. Mehmar						+		+																			
54. M. Shalem												+															

1. Includes Barkai tomb cave.
2. Includes "Herodian" Jericho.
3. Includes the City of David, Tel en-Nasbeh and Motza.
4. Includes Givatayim.
5. Includes Tel Bet Shemesh.
6. Includes Nahal Yarmuth (Ramat Bet Semesh).
7. Includes Site H.

Central and southern regions, EB II.

Sites: See opposite pages.

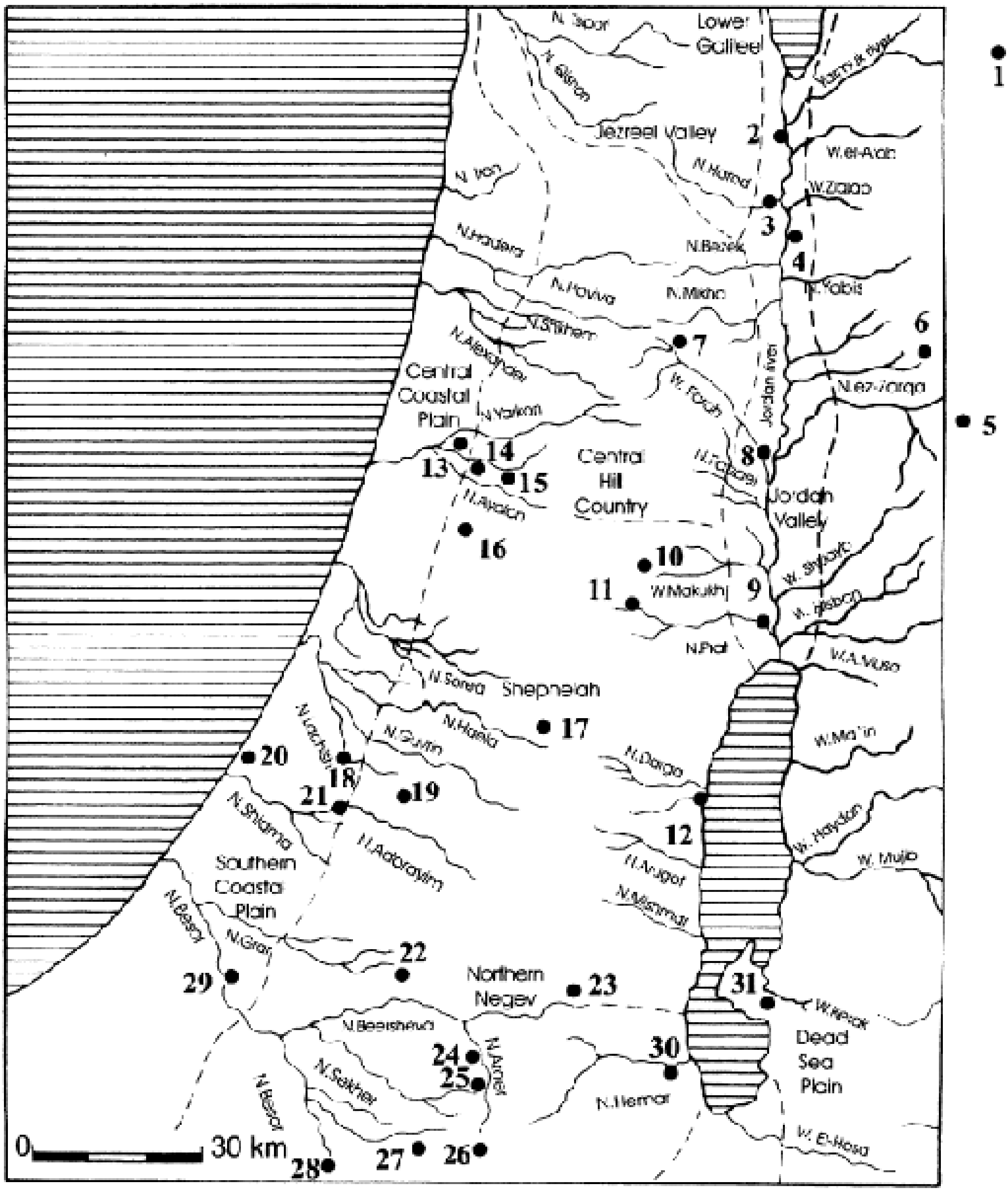


Figure 11.5 Central and southern regions, EB II.

Central and Southern Regions, EB II

Sites \ Commodities	Metallic Ware	Tel Aphek Bowls	Arkosic group	Fossil Shells group	Calcite group	Fine quartz group	Chert group	Canaan. Cores	Canaan. blades	Tabular scrapers	Beach-rock	Sand-stone	Metall. remains	Metal objects
1. K. Zeraqon	+													
2. T. Yaqush	+													
3. B. Shean	+	+							+	+				
4. Pella														+
5. T. Handaquq N														
6. A. al-Kharaz	+	+												
7. T. Farah N		+												
8. K. Mahruq														
9. Jericho		+												+
10. 'Ai	+				+									+
11. Jerusalem									+	+				
12. M. Shalem									+	+				
13. T. Aphek		+							+		+			+
14. T. Dalit		+							+					+
15. T. Bareket														
16. Lod		+							+		+			+
17. T. Yarmuth	+	+							+	+				
18. T. Erani	+													
19. Lachish	+	+							+(?)	+(?)				
20. Ashkelon														
21. T. el-Hesi					+									
22. T. Halif					+	+								
23. Arad	+	+	+	+	+	+	+		+	+		+	+	+
24. T. Esdar			+		+					+				
25. K. Telem			+											
26. N. Refet			+											
27. H. Avnon			+						+					
28. N. Zalzal			+											
29. E. Besor			+						+	+				
30. N. Hemar														+(?)
31. B. edh-Dhra									+	+				

Central and Southern Regions, EB II (cont.)

Sites \ Commodities	Grain	Olive & grapes	Trees	Pulses	Med. species	Red Sea species	Nilotic species	Donkey remains	Donkey figurines	Hippo remains	Ivory objects	Bitumen	Carnelian
1. K. Zeraqon									+				
2. T. Yaqush													
3. T.B. Shean													
4. Pella													
5. T. Handaquq N		+											
6. A. al-Kharaz	+	+		+	+			+(?)		+(?)	+		
7. T. Farah N											+(?)		
8. K. Mahruq									+				
9. Jericho	+	+		+	+	+		+					+(?)
10. 'Ai					+			+(?)		+	+		
11. Jerusalem													
12. M. Shalem													
13. T. Aphek		+						+	+(?)	+			
14. T. Dalit		+	+	+				+		+		+	+
15. T. Bareket									+				
16. Lod					+	+	+(?)	+	+				
17. T. Yarmuth												+	
18. T. Erani													
19. Lachish		+(?)	+(?)	+(?)	+(?)								+(?)
20. Ashkelon													
21. T. el-Hesi													
22. T. Halif													
23. Arad	+	+	+	+	+	+	+	+	+	+	+	+	+
24. T. Esdar													
25. K. Telem													
26. N. Refet													
27. H. Avnon													
28. N. Zalzal													
29. E. Besor													
30. N. Hemar													
31. B.edh-Dhra					+(?)	+(?)							

Central and southern regions, EB III.

Sites: See opposite pages.

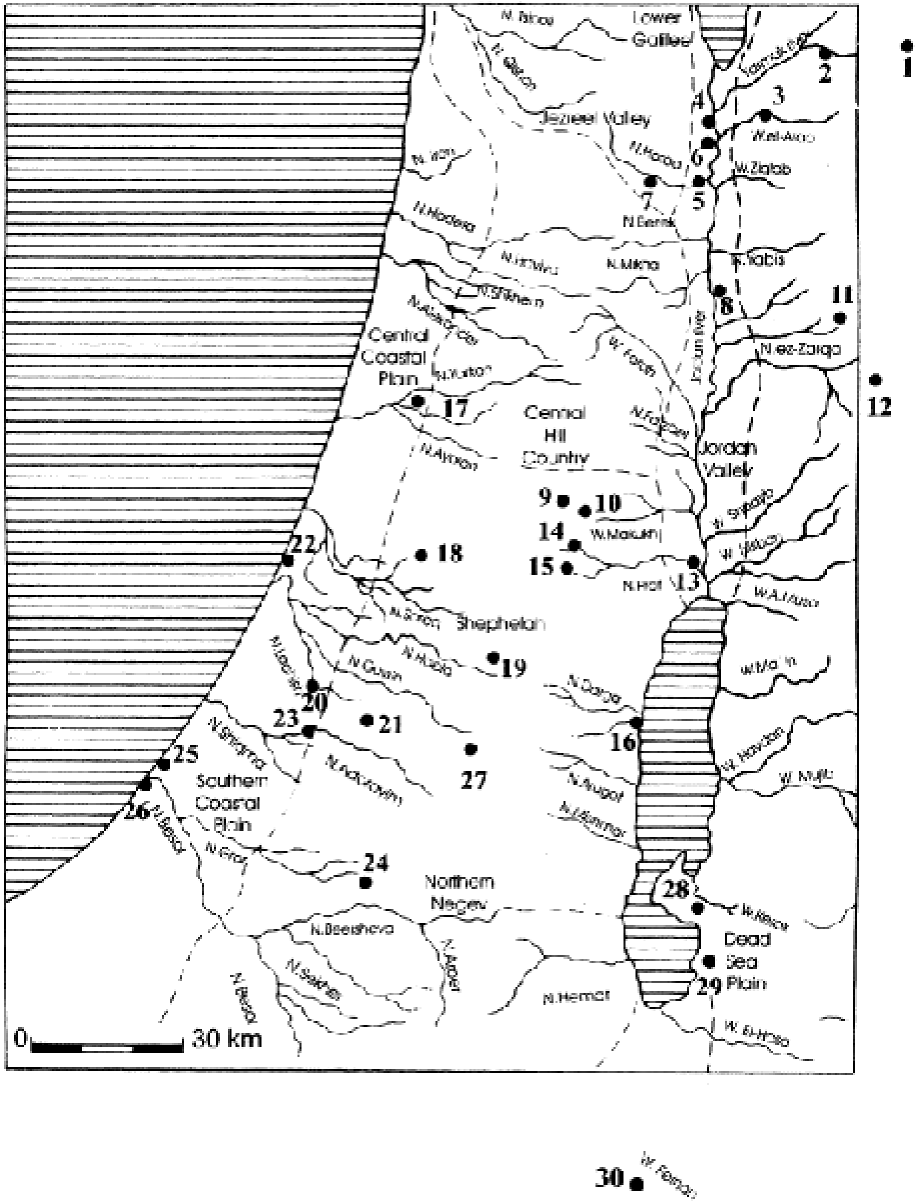


Figure 11.6 Central and southern regions, EB III.

Central and Southern regions, EB III

Commodities / Sites	Khirbet Kerak Ware	Dead Sea Plain Temp.	Canaan. Cores	Canaan. blades	Tabular scrapers	Beach-rock	Metall. remains	Metal objects	Grain	Olive & grapes	Trees	Pulses	Med. species	Red Sea species	Donkey remains	Donkey figurines	Hippo remains	Ivory	Bitumen	Camel.
1. K. Zeraqon	+									+										
2. A. edh-Dhar	+																			
3. T. Shuneh	+																			
4. T. Yaqush	+																			
5. B. Shean	+			+	+															
6. T. Estaba	+																			
7. T. Yosef	+																			
8. T. Saidyeh	+								+	+	+			+(?)						
9 . Bethel	+																			
10. 'Ai	+			+				+												
11. T.A. Kharaz																	+(?)	+(?)		
12. Handaquq S										+										
13. Jericho	+				+(?)		+	+	+	+	+	+	+	+		+	+	+		+
14. Jerusalem	+				+(?)			+		+(?)										
15. B. Sahur	+																			
16. M. Shalem					+(?)															
17. T. Aphek	+																			
18. Gezer	+				+(?)															
19. T. Yarmuth	+			+	+			+		+	+(?)		+	+	+				+	
20. T. Erani	+														+(?)					
21. Lachish	+			+	+								+(?)							+(?)
22. Nizzanim	+																			
23. T. el-Hesi	+			+	+	+		+	+(?)	+	+(?)		+						+	
24. T. Halif	+		+	+	+					+		+	+		+					
25. T. es-Sakan				+	+										+					
26. T. Ikhbene				+ (?)																
27. T. Hebron				+	+			+											+(?)	
28. B. edh-Dhra	+	+		+	+(?)			+					+(?)	+(?)				+		
29. Numeira		+							+	+	+	+			+					
30. W. Feinan							+	+		+										

That the Shephelah acted as an interface region between the Hill Country and the Coastal Plain is better represented in this study by evidence of considerable circulation of pottery wares such as the EC, DW and TAB in patterns that form contiguous areas. For example, there are three sites along Nahal Lachish during EB I, Lachish, Horvat Ptora and Tel Erani, from east to west. Almost all the same commodities are found at these three sites, showing that they were part of the same exchange network. During the EB II and III, Lachish and Tel Erani yielded most of the commodities discussed in this work.

Northern types of GBW are unknown in the Shephelah during EB I, but MW did make its way there in EB II, probably through the Central and Southern Coastal Plains. If the KKW found in the center and south of the country originated in the north, it problably made its way there through the Jordan Valley. However, if more southerly centers for production of KKW existed (as suggested by de Miroschedji 2000c), one of these centers may well have been located in the Shephelah. Precisely how and from where this ware was distributed is unclear. One option suggests that itinerant potters produced it in different locales, which might explain some greatly varied petrographic profiles obtained from different examples.

Copper objects made their way to the Shephelah but not in great quantities. Shells, mainly from the Mediterranean, but also the Nilotic *Chambardia*, are well represented, as well as Egyptian or Egyptianized pottery. The presence of thes items are thought to be the result of redistribution from sources in the Southern Coastal Plain. Canaanean blades probably have their own sources (Gezer, the Yarmuth area), but they also could have been acquired from sites further south such as Gat Guvrin and Tel Halif.

Communication between the coastal plain and the inner mountainous regions took place through east-west *wadis* (Nahal Soreq, Nahal Guvrin, Nahal Lachish and Nahal Shiqma) which provided relatively easy passage. Sites of the Southern Shephelah were often located where different geographic regions converged. They appear to have been strategically placed for encouraging exchange. Lachish took advantage of this exchange, as did other sites such as Tel Yarmuth, in the area of Nahal Yarmuth and the basin of the Soreq.

C. Central Coastal Plain

The Central Coastal Plain was a corridor through which products from the coastal shores were distributed to the interior. Examples of this type of exchange are found in beachrock tools and shells (both from the Mediterranean and the Nile) which were encountered in eastern regions. Some carnelian beads found in cave tombs in the Central Coastal Plain may also be evidence of this. The series of donkey figurines found along the Central Coastal Plain and the Yarkon-Ayalon-Lod basin, where also donkey remains were encountered, indicate that several groups of merchants were active in this region.

Pottery did not circulate from north to south or *vice versa*, except for the case of GBW which originated in Lower Galilee and the Jezreel Valley and made its way to the Coastal Plain through the Wadi Ara route. The donkey figurine found in a tomb near En Assawir could be related to merchants active in that region.

The area of Nahal Alexander seems to have been a location of metallurgical activities and exchange; probably the metal objects arrived there and to other sites in the Central Coastal Plain via the Central Hill Country. A sub-region, part of the Central Coastal Plain is the Ayalon-Lod basin which appears to have exchanged pottery with the Jordan Valley. During EB IA, SDS pottery from the eastern Jordan Valley made its way to that sub-region, while during the EB I-II pottery groups originating in the Central Coastal Plain, such as TAB, circulated in the Shephelah, the Central Hill Country and the Jordan Valley.

D. Southern Coastal Plain

The Southern Coastal Plain is contiguous with the Southern Shephelah and in turn with the route that leads to the Negev, through Nahal Habesor and Northern Sinai. These routes appear to have been used during EB I, II and III (see Gophna 1974:160, 165; 1984:29), although temporal fluctuations in the amount of traffic along them may be assumed.

EC pottery had a limited radiation from its core area, the Southern Shephelah, spreading as far as the Southern Coastal Plain and in some few instances to the Central Hill Country and Jericho. Mediterranean shells and beachrock tools were distributed to the east, as well as Nilotic *Chambardia* shells. DW originated in the Hill Country and was found in the Southern

Coastal Plain, surely after passing through the Shephelah. Bitumen arrived there from the Dead Sea via the same route.

While most of the donkey figurines were found in the Central Coastal Plain, the site of Afridar in the Southern Coastal Plain produced the largest quantities of equid bones. These finds probably indicate a relationship to production and exchange of metal artifacts. In such a situation the advantages offered by these beasts of burden, especially if they had to transport heavy ore or fuel, are obvious.

3. Southern Regions

A. Northern Negev

The Northern Negev was also a region that became a main route for exchange between east and west and between north and south. The primary axes of the region are Nahal Habesor, Nahal Grar and Nahal Beersheva. Sites along Nahal Habesor performed an important role in the exchange of goods during EB I.

Tel Halif, located near the Hebron Hills and the Shephelah seems to have been another site with important exchange associations in EB I. During EB II, Arad was a center of distribution for several southern pottery groups, recognizable by their fabrics and tempers. They include: Arkosic vessels from the eastern Aravah, Fine quartz and Chert groups from the north-western Negev (e.g. Tel Halif) and a Fossil shell group from the Uvda Valley. Arad's exchange network included the exportation of locally made pottery of the Calcite group to several sites of the Negev and to 'Ai. Arad was also a center of redistribution for metal objects as well as a settlement where metallurgical activities also took place. The aforementioned materials and activities represent exchange relations between the northern Negev and the eastern Aravah along routes leading to the Dead Sea and southwards. It also seems to have been a route for the distribution of bitumen (cf. Yekutieli 2004). Bitumen has been found to the west at sites like Small Tel Malhata and others further south. Again it should be noted that if the Jafr basin area was producing tabular scrapers in the EB Age, then Arad must also have been a redistributor of these objects to western Canaan.

In exchange the less arid northern regions provided Arad with grains and wood, part of which were probably redistributed to the south. Arad was most probably not only a 'gate to the desert' (Amiran, Ilan and Sebbane 1997) but also a gateway between the Negev and all surrounding areas. *Chambardia* shells and Egyptian pottery found their way to Arad, probably through networks distributing other, local goods. Amiran and Ilan (1996:67–73, 142; Pls. 37:1, 2; 86) have suggested that the open spaces at Arad can be related to market (i.e. bazaar) activities. Equid remains and donkey figurines are additional indications for the transportation and exchange of commodities noted above.

During the EB III Tel Halif seemed to have played an important role in the distribution and exchange of pottery and Canaanean flint blades and tabular scrapers.

B. Central and Southern Negev

The central and southern Negev comprises a series of sub-regions, including the Negev Highlands, the Ramon Crater and contiguous crater areas, the Uvda Valley and the southern Aravah. Exchange activities in the EB II are mainly documented at sites in the Negev Highlands and the Uvda Valley. Pottery groups from the Negev were exchanged, with the site of Arad acting as a redistribution center. Unfortunately, as we saw above, the date of the tabular flint sources at Har Qeren, in the western highlands, is not well established, but they may have been active during EB II. Trade in tabular scrapers must have linked that region with the Southern Coastal Plain and the southern Negev. The Ramon Crater was the center of production of sandstone tools, mainly for sites in the nearby Negev but also for sites further to the north. Carnelian sources existed in the Ramon Crater, and it seems that this stone (whether as raw material or as elaborated beads) arrived in the north via two main routes, one across the coastal plain and the other through the Jordan Valley.

Sites in the Uvda Valley yielded evidence for exchange of Red Sea shells and timber and probably agricultural produce from more northerly sites. While we do not know the exact sources of tabular scrapers (and the few Canaanean blades found at Biqat Uvda), it is most probable that they arrived from the northwest or northeast. The contiguous area of the Aravah was surely the main axis of exchange. Through this route bitumen was likely to have made its way to Biqat Nimra and Biqat Uvda. The exchange of products in this region, which includes relatively long distances in comparison with other regions of the country, probably included Bedouin-like traders as an important component (see Bienkowski and van der Steen 2001 for a discussion of similar activity in later periods).

C. Eastern Dead Sea Plain and Aravah

The eastern Dead Sea Plain includes the major site of Bab ed Dhra. In EB I there is little evidence (e.g. LPGW) for interaction between it and more distant regions. However, later in EB II and EB III, it appears to have been engaged in exchange, especially of ceramics. By EB III the more southerly site of Numeira was settled and there is evidence of extensive exchange between it and Bab edh-Dhra of some pottery wares, as may be inferred from the very specific tempers used.

Bab edh-Dhra and Numeira were connected with the northern Negev and the Aravah. These sites were likely indirect sources of several pottery wares from central-western Canaan and Mediterranean sea shells found at more southerly

sites. Perhaps specialized flint tools and crops as well as some luxury items such as ivory, carnelian and Red Sea shells were also exhanged along the same route. Bitumen was certainly obtained from the Dead Sea; metal objects from Wadi Feinan and basalt from northern nearby sources of Mujib/Kerak, Sweimeh and Ma'in and would have made their ways to points distant via the Dead Sea and Aravah segments of the Great Rift Valley. If the Jafr basin area was the producer of tabular scrapers during the EB, then it is likely that Wadi Feinan was a station for these tools on their way to Arad and western Canaan. It must be pointed out that eastern Aravah is isolated from the northern wares during the EB I, II and III.

The eastern Aravah dominated production and distribution of metal objects, with its center in Wadi Feinan. During EB II, Arkosic vessels widely distributed in the Negev were also produced in that region. Those items were exchanged for flint tools, agricultural produce and shells. Some basalt tools found at the Wadi Feinan sites apparently originated nearby to the east, in the area of Dana/Tafila, but were imported from sources in northern Transjordan, suggesting they came to the Wadi Feidan through Bab edh-Dhra, at least during EB I (see Chapter 5, Section 2).

It is possible that Bab edh-Dhra (during the EB I, II and III) and Numeira (during the EB III) acted as trading posts for metal objects produced at Wadi Feinan. They were probably distributed in Transjordan through a route going east of the Dead Sea. The relatively large frequencies of donkey remains at Bab edh-Dhra might attest to it as a way-station or depot in the exchange network.

4. Local Riverine and Coastal Maritime Traffic?

The likely existence of a maritime, coastal route Mediterranean following the shore has been pointed out during the last decade by Gophna (Gophna and Liphschitz 1996; Gophna 1997, 2002a), based on the presence of Cedar of Lebanon and Turkey oak at Afridar Areas G and El respectively (Liphschitz 2004a) and the remains of metallurgical activities at coastal sites. Afridar has been hypothesized to have had a harbor from which metallurgical items were transported or distributed, perhaps even to Egypt (Gophna and Milevski 2003).

There is a small body of evidence to suggest that Mediterranean voyaging took place from the Neolithic onwards (Marcus 2002b). Baumgarten (1993) has suggested that one of the Chalcolithic ossuaries found at Azor (Perrot 1961a:Pl. 23:3, Pl. IV), a site on the Mediterranean littoral quite near the shore, exhibits a drawing of a ship (but see Marcus 2002b:406). An Egyptian vessel was found off the coast of Atlit in the lee of the northern ridge of the cape (Galili *et al.* 2002) with Nilotic *Chambardia rubens.* That extraordinary find suggests maritime activity dating to the period of Ma'adi, approximately correlated to EB IA. A contemporary settlement at the coastal site of Tel Megadim could have been involved in such activity. Boat representations from Megiddo

indicate they were used in the EB (Beck 1995:11, Fig. 7a, Marcus 2002b:406; Figure 27:4). Anchor-like objects (Hebrew: *shfifonim*) were found outside the EB II gate of Bet Yerah (Wachsmann 1985:395–6, Figs. 3-5) and it is suggested they were related to boating on the Sea of Galilee and a cult associated with it (see also below).

Southern regions, EB I.

Sites: See opposite page.

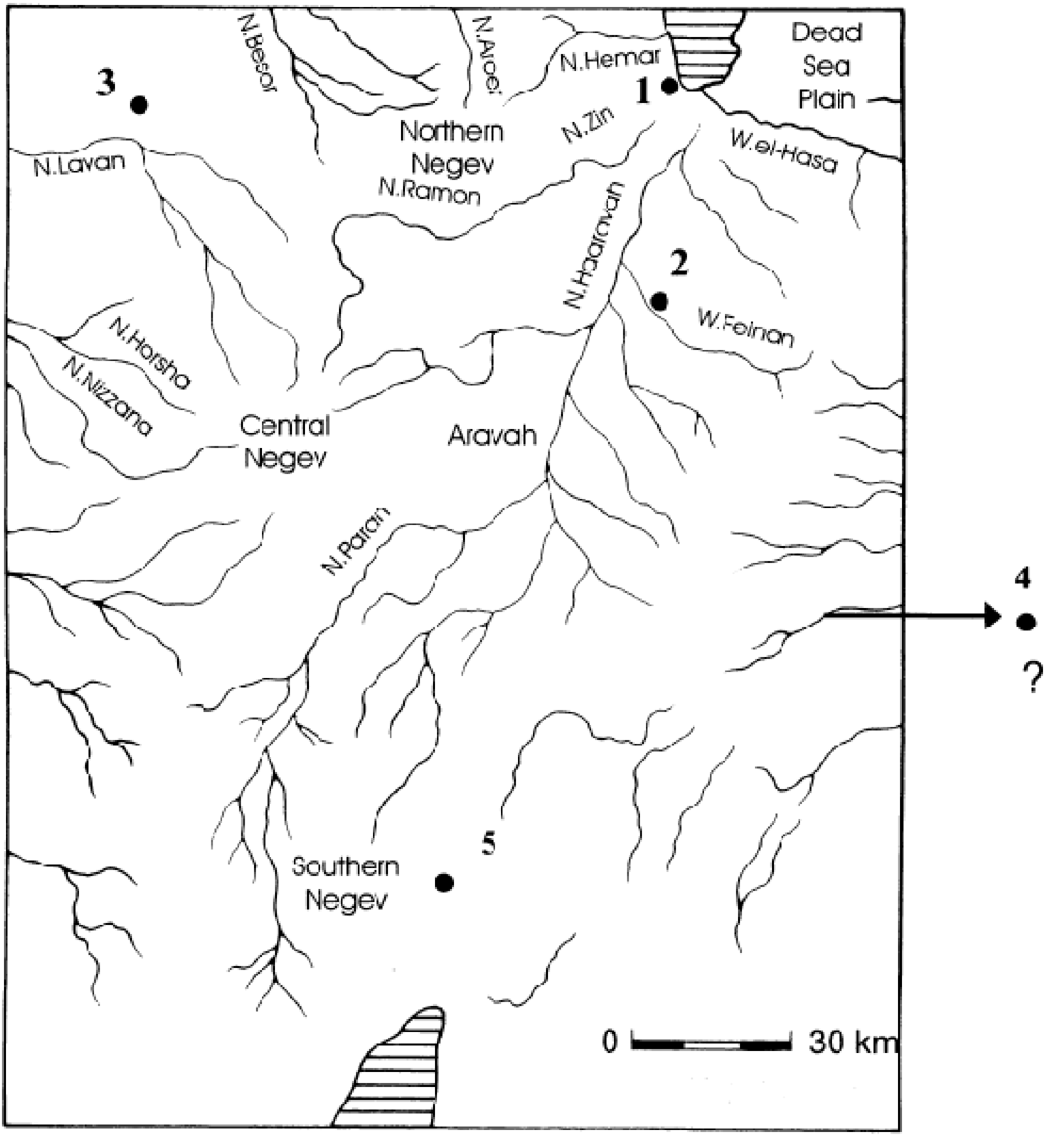


Figure 11.7 Southern regions, EB I.

Southern regions, EB I

Commodities / Sites	Tabular scrapers	Basalt	Metall. remains	Metal objects	Grain	Olive & grapes	Pulses	Med. species	Red Sea species	Bitumen
1. Safi		+								
2. W.Fidan 4	+	+	+	+	+	+	+	+	+	
3. Q.A.Tulayha	+(?)									
4. H.Qeren	+(?)									
5.B.Nimra										+

Recent excavations at Tell es-Sakan in the Gaza Strip have added greatly to our knowledge of remains of the EB on the southern coast (Gophna 1997). The site, dating to EB I and EB III (de Miroschedji and Sadeq 2000, de Miroschedji et al. 2003) seems not to have been settled in EB II. Its location on the south bank of Wadi Ghazzeh (Nahal Habesor), quite near the coast, as well as its size, would have made it a likely port or at least a convenient place to stop for coastal maritime activity. It may have even served as a center for distribution of Egyptian and Egyptianized materials to sites further north, perhaps by sea. EB I pottery sherds identified at the Jaffa excavations directed by Z. Herzog (Gophna 2002a:420, n.l) could indicate another coastal site in this early period. Further north, EB I remains were also reported at Tel Megadim (Wolff 1998), Tel Akko (Dothan 1993:226) and Rosh Haniqra (Tadmor and Prausnitz 1959) which could have functioned as anchorage points in the Canaanean coast.

Documents from Ebla (ca. 2,500 BC) mention cities on the Canaanean coast (Pettinato 1979:185). These documents probably include the names of south Levantine sites such as Akko, Jaffa, Ashdod and Gaza, together with Megiddo and Lachish (but see Archi 1980:5-8). The assumption is that a series of coastal sites served as harbors for Mediterranean trade and exchange with the southern Levant. The question posed here is whether these coastal harbors were not only part of a Mediterranean external trade but may also have been utilized as local exchange routes involving those sites. For instance, did some of the northern pottery wares make their way to the Southern Coastal Plain by boat from a harbor located opposite the Carmel, or did copper tools and weapons arrive via a maritime coastal route to the north of Canaan from Afridar?

Unfortunately, present data do not support the idea of a coastal maritime route and its very existence remains open to question. Nor is there proof of fluvial transportation along the Yarkon, Nahal Alexander, the Yarmuk or the Jordan Rivers, such as existed in Mesopotamia (Finet 1969; Joannès 1996) and Egypt (Partridge 1996), although these streams were navigable for small craft with little draft. However, the Sea of Galilee was eminently navigable (for the transport of KKW to sites in the Golan?), as was the Dead Sea for transporting other goods (e.g. DW, Canaanean blades, bitumen). These sizable bodies of water may well have been used, at least partly, for the transportation of goods within networks of exchange.

Southern regions, EB II.

Sites: See opposite page.

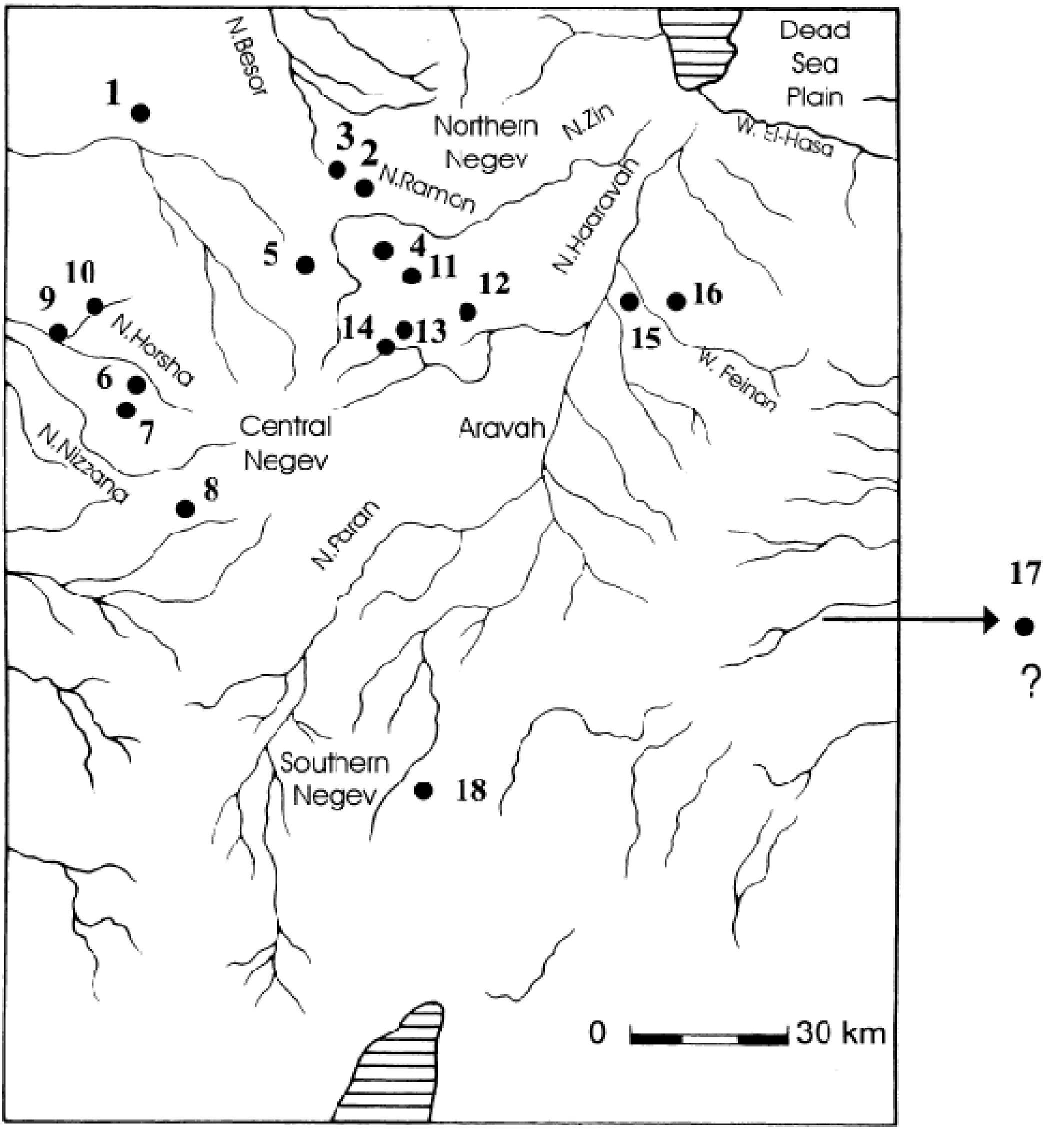


Figure 11.8 Southern regions, EB II.

Southern Regions, EB II

Commodities / Sites	Arkosic group	Fossil Shells group	Calcite group	Fine quartz group	Chert group	Canaan. blades	Tabular scrapers	Sand-stone	Metall. remains	Metal objects	Olive & grapes	Trees	Red Sea species	Donkey remains	Bitumen
1. H. Qeren							+(?)								
2. H. Yeruham	+		+												
3. N. Boqer	+														
4. H. Ahdir	+				+			+							
5. R. Matred	+						+								
6. H. Horsha	+						+	+							
7. E. Kadis	+														
8. E. Hameara	+	+		+			+								
9. K. Barnea	+						+								
10. N. Mitnan							+								
11. R. Nafha 396								+					+		
12. R. Saharonim N								+							
13. Camel site								+							
14. N. Ramon 204/160								+							
15. Feinan 9 and 16											+				
16. B. el-Hatyeh	+								+	+					
17. Q. A. Tulayha							+(?)								
18. B. Uvda	+	+		+		+	+			+		+	+	+	+

Notes

1. The existence of Megiddo during the EB II has been questioned in recent years (cf. Greenberg 2003b).

2. For the cult of the moon in Canaan see, among others, Albright 1938 and Key 1965. For the relation between the bull and the bull's image (Chapter 8) and the moon cult see Ornan 2001.

IV
CONCLUSIONS

12

Conclusions and Perspectives

1. Aspects of the Exchange Networks: Centralization, Directionality and Symmetry

Interpreting patterns of exchange through data from the archaeological record can, at least for certain commodities, be difficult and the results somewhat tentative because of limitations of available data. This work, using such data, attempts to do so despite the problematic nature of the task.

By researching exchange of commodities during the EB Age some important observations may be made (Figure 12.1). Primarily, it may be stated that no centralized or unified network of exchange existed, rather there were several lines or paths of circulation that at times converged into something approaching networks some of which eventually displayed evidence of regional centralization. Separation of networks is sometimes clearly observable, as that between the north and south-central regions, where little interaction or mutual exchange is noted. However, some networks actually linked different regions, as those of the Hill Country and the Shephelah, and those of the Southern Coastal Plain with the Shephelah, so that in different time spans and in associations with different commodities, intercourse between different regions did take place.

Economic aspects of these networks are notable in patterns discerned. They indicate each branch of production had a defined network of distribution sometimes associated with related commodities as in the case of Canaanean blades and bitumen in the center and southern regions.[1] Other patterns suggest sympathetic networks for more than one commodity, as in the case of Arkosic holemouth ceramic vessels and metal objects in the northern Negev during EB II.

In particular, networks of pottery distribution showed well-defined patterns (Figure 12.2). The outstanding characteristic of pottery distribution networks in most cases is in the existence of concentric areas of circulation radiating from core areas where it appears pottery was produced. In addition there are some cases of pottery exchange networks in which distribution of specialized wares remained within a very restricted zone. Such patterns shifted over time and accordingly chronological parameters are all important in understanding networks of pottery exchange during the EB Age. In general there appears to be a major trend from a general decentralization of production during EB IA towards regional centralization in EB II with a return to less centralization in EB III.

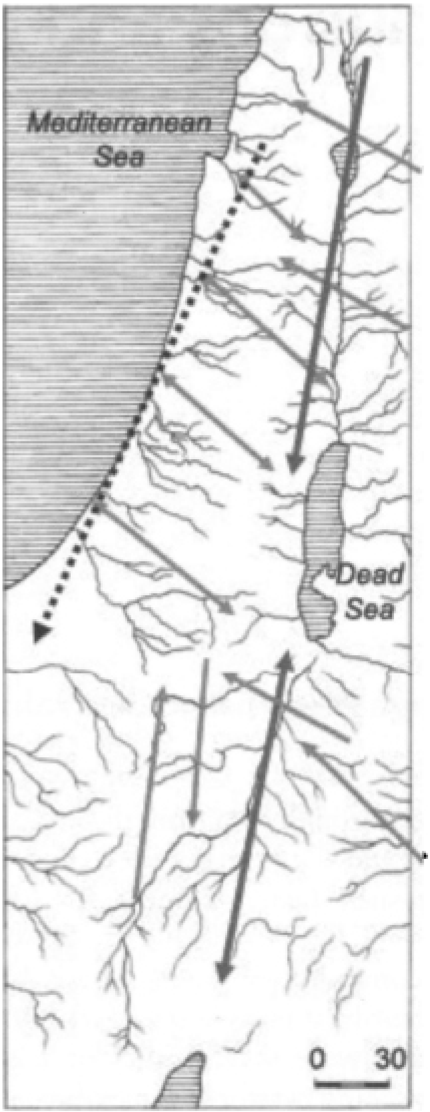


Figure 12.1 Directionality of EB commodities.

Exchange of Canaanean blades similarly indicates some type of centralization dominated by regional centers that distributed blades in relatively closed networks. However, the distribution of Canaanean blades differs from that of pottery circulation because it involved several stages through which objects passed between the workshop of the knapper and the end user, the agricultural worker who received the blades and sickles (i.e. retouched tools). This type of network circulation could also be relevant for metal objects that may have passed through a number of stations. Presumably they derived from copper sources in the Feinan area and passed through metallurgical workshops before finding their way to end users. There is, however, a major difference in the locales of these networks. Metal sources seem to be only in the eastern Aravah, while Canaanean flint segments originated in numerous locales in the center and northern regions. Such examples differ considerably from the pattern suggested by distribution of tabular scrapers. These specialized tools appear to have been exchanged over long distances from supposed centers of production. Notably, scrapers gradually decrease in appearance at sites from south to north as the distance from the sources of material grows greater.

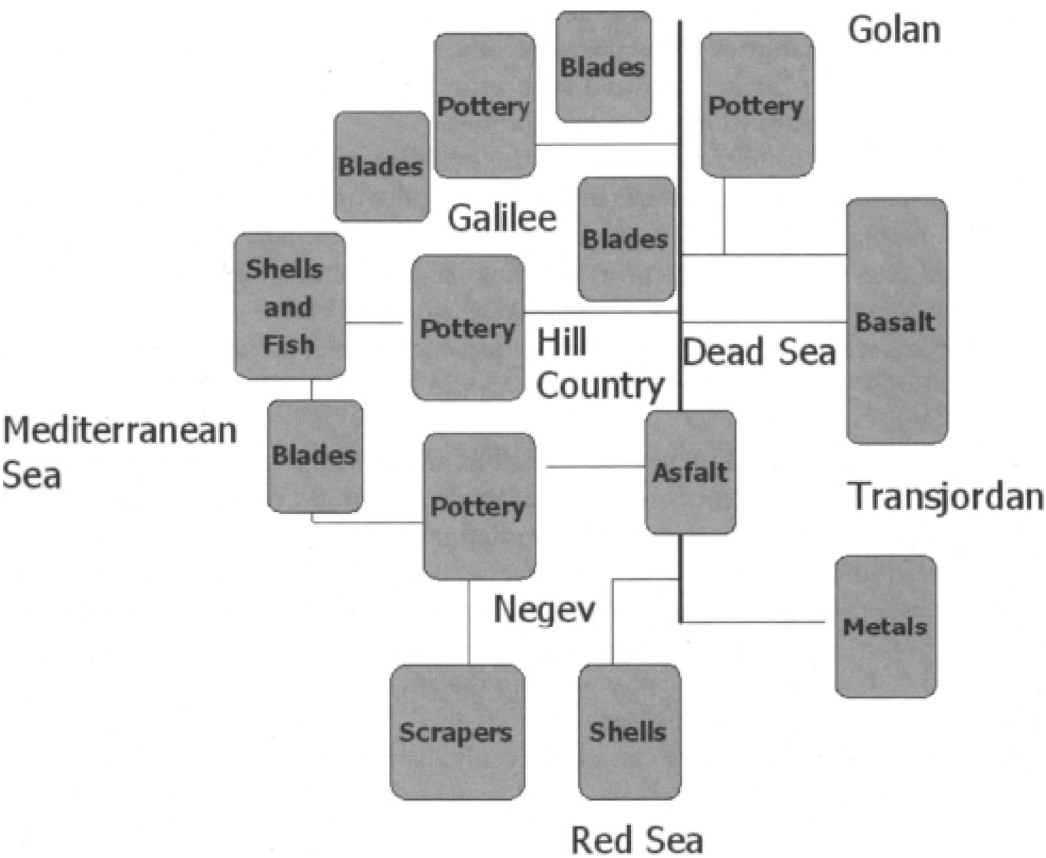


Figure 12.2 Exchange diagram with main networks of EB commodities.

Simple networks, such as those concerning distribution of raw materials (bitumen, carnelian) and shells were characterized by more direct patterns of exchange. Of course they were also subject to chronological variations. Such commodities of diminutive size and/or small quantity, derived from specialized sources and had relatively simple, more or less linear distribution networks. It is likely they represent some kind of 'down-the-line' model of exchange of the type proposed by Renfrew (1975) in which they travel through successive settlements and regions by subsequent exchanges.

It is difficult to express in general the relative abundance or lack of exchanged commodities per network or region since quantitative data is available in only some few instances. Generally this information is confined to objects such as flints and zooarchaeological and archaeobotanical remains. Nevertheless, attempts have been made to calculate parameters of absolute or relative abundance of given commodities (e.g. Earle and Ericson 1977:6) as a function of distance from sources, weights or quantities of artifacts or raw materials. Such attempts allow for estimates which then may be further factored with estimates relating volumes of excavated areas to quantities or frequencies of specific commodities.

This work has attempted to take into account the problems of limited data noted above and then consider distances from the sources or between locales of exchange, not just in linear terms, but also by taking into account topographical features that add to the expenditure of energy and costs (see Chapter 3, Section 1). These social factors (i.e. energy expended and costs in terms of outlay of resources) were likely to affect entire communities to the extent their inhabitants were involved in production and exchange of a commodity (Petréquin and Petréquin 2000:364–6). Such oriented activity would have direct effects on these early societies of the EB Age.

With all the above considerations in mind it is possible, at least to a limited extent, to address questions of quantities of the different commodities locally exchanged during the EB Age. It is assumed that in all cases, abundance of pottery types defines core areas, while lesser quantities in more distant zones indicate pottery distributed from core areas. This interpretation seems to be borne out by observations from the archaeological network. In general all morphological types of particular wares or groups of wares tended to be found within core areas, while few variants seemed to have made their way to more distant locales and those that did were generally the smallest and easiest to transport.

Basalt and ground stone tools seem to be most evenly distributed and they were relatively abundant in relation to distances and their weight. Canaanean blades had a restricted area of distribution although distances from the flint sources were not great. By contrast, most metal objects were concentrated in the south-central regions, close to the sources in the Wadi Feinan area, although some few were found in northernmost sites such as Rosh Haniqra and

Tel Dan.

Directionality of the networks, i.e. the direction in which commodities flow, is sometimes difficult to establish from the archaeological record. When it could be observed it indicated a diversity of patterns that not necessarily oppose one another, although sometimes it is difficult to follow the circulation outlines of some commodities. The Huleh Valley, the Jordan Valley, the Aravah and the Central and Southern Coastal Plains acted as the major south Levantine conduits for exchange along a north-south axis in accordance with their geographic parameters. Galilee, the Jezreel Valley, the Central Hill Country and the Shephelah tended to be regions in which east-west tracks were observed. The Negev and southern regions appear to have fostered exchanged networks showing mixed directionality. In particular cases such as that involving exchange of Canaanean blades, as far as may be understood, there are multidirectional networks, dependent on location of sources, sites and the extent of particular areas in which exchange took places.

Exchange networks during the EB Age show unequal patterns that were sometimes symmetrical (i.e. bi-directional with commodities going back and forth between regions) sometimes uni-directional. Several examples indicate the types of patterns. Notably, pottery of northern origin (i.e. GBW, MW and KKW) has been found at southern sites, while virtually no southern pottery wares (e.g. the Negev wares) have been found in northern sites. Utilization of bitumen for hafting flint tools is well known at south-central sites and, significantly, is unknown at sites in the north. Prestige or luxury items such as shells have a long range of distribution and are found both in southern and northern regions, but these goods do not seem to affect the exchange networks. Flint tabular scrapers that most probably originated in southern areas were brought in small amounts to sites in the north. Although poorly represented there, they are evidence of that some of those objects could be exchanged over long distances. It can also be suggested that these scrapers found their way through networks that were primarily devoted to other commodities.

The only areas that show a degree of symmetry in the circulation of goods are the Jordan Valley and to a lesser degree the Aravah. Patterns of exchange in the Jordan Valley underwent change over time with most circulation of commodities occurring during EB I and EB III. The Central and Southern Coastal Plains also illustrate a certain degree of symmetry, having their connections with the eastern areas of the Shephelah, the Central Hill Country and the northern Negev. In the cases of the Jordan Valley and the Coastal Plain, there is a predominance of northern products, indicating much stronger links with that region of the country rather than with the south. Lack of symmetry within exchange networks and between different ones is understood to be the most significant factor for explaining why no centralized or unified network of exchange ever existed in the EB Age of the southern Levant.

Galilee, the Huleh Valley and the Jezreel Valley exhibit decentralized exchange of pottery during the EB IA. To judge from distribution pattern of

types (i.e. families) of GBW (see Chapter 3, Section 2) exchange was not symmetrical. Main centers of production of GBW (Families Ia-d) appear to have been in the Jezreel Valley and Lower Galilee, while other types, (Families Ie-f) were apparently produced in centers in Western Galilee and the Huleh Valley. Asymmetrical also are network relations between north and south during EB II. MW arrived at southern sites but southern pottery groups of the Negev did not reach the central and northern regions (with the exception of ‘Ai). Furthermore there is no correspondence between the appearance of MW and the TAB, although both groups are notable for having common forms (i.e. small carinated bowls).

It must be emphasized that decentralization and the diversity over the varied areas of exchange of the southern Levant during the EB Age are the main characteristics of exchange networks that could be observed. Indeed, the southern Levant may best be characterized in regards to exchange as a mosaic of regions loosely held together with skeins of far-flung networks that, at certain peak periods of activity, showed evidence of regional centralization. Plog (1977) has defined similar phenomena that may be used to describe the southern Levant in EB I (as was already noteb by Joffe 1993:53) as well as in EB II–III.

2. Variations in Patterns of Exchange over Time

In general, the EB I presents the most variegated forms and number of networks. Exchange networks of the EB I are the most numerous and varied for the entire EB Age. Some appear in the very beginning of the EB IA. They include a system responsible for distribution of tabular scrapers (probably an outgrowth of an earlier Chalcolithic network), one for dispersion of GBW, one for shell distribution (including Nilotic *Chambardia*) and another (albeit to a lesser extent) for distribution of metal objects involving centers at Wadi Feinan and a workshop/center at Afridar. Distribution of basalt vessels and tools shows some degree of continuity from Chalcolithic times, although typology of objects and distribution patterns are different. During EB IB the multiplicity of commodities and networks reached its peak. If it were possible to measure the degree of exchange according to Earle and Ericson’s (1977) parameters, the abundance of commodities in this period could be judged by counting artifacts from the archaeological record. Notable in this period is an increasing number of pottery types, greater circulation of raw materials (e.g. bitumen, carnelian) and a standardized network of production and distribution of Canaanean blades and tabular scrapers indicating longer travel over greater distances. This is reflected in another, albeit smaller way in the archaeological record. It is interesting to note that while the EB IA yielded higher frequencies of donkey remains, it was not until EB IB that the first representation of these animals in figurines appeared, and then mostly in ritual contexts. This is probably the

result of a guild of merchants that consolidated only at the end of EB I.

Noted increases in exchanged goods from EB IA to EB IB could be the result of population growth in the latter period (Gophna and Portugali 1988:20). However, by EB II there was a decreased number of commodities interchanged that may have been reflected also in reduced quantities of goods (e.g. pottery, metals, agricultural produce and minerals). These changes may be the result of a reduced number of settlements in EB II that tended to have larger concentrations of population (Portugali and Gophna 1993:169–75). When interpreting this information there is a likelihood of bias because the reduced numbers of sites may be perceived as evidence of reduced exchange, although quantitatively this may not have been the case, but rather a function of an incompletely understood or preserved archaeological record. It is possible that very large population centers, not extensively excavated, would not have yielded data on this matter. Centralization in distribution of some pottery wares such as MW surely reflects this tendency.

Development of exchange seems to follow the same pattern of ups and downs as urbanization during the EB Age. According to Getzov, Paz and Gophna (2001:41–5) in Upper Galilee, the Northern Coastal Plain and the Northern Hill Country, a severe crisis occurred at the end of EB II and these regions became and remained almost deserted in EB III. In the Huleh Valley and Lower Galilee the crisis was less severe and some centers continued to exist. In the Jezreel and Jordan Valleys and the Central and Southern Coastal Plains the number of urban settlements was more or less stable during EB II and III. But the greatest stability of urban centers occurred in the Shepelah and the Southern Hill Country, with the exception of Arad in the Northern Negev, that ceased to exist by the end of the EB II.

One of the changing aspects of the shifting from villages to towns and cities and the development of the exchange between these settlements must have been the rise of ‘imports’ into these locales. Ziadeh (1995:1007) has pointed out that the most changing aspects of material culture lie in the shift from a self-sufficient economy to an economy based on wage-labor and are reflected in domestic artifacts. For instance, traditional pottery from the Palestinian village Ti’innik (Taanakh) was replaced mainly by aluminum, glass and plastic artifacts. These objects were acquired through exterior relationships (*idem*).

It is probable that during EB II and III, urban centers acquired ceramic groups such as TAB, MW, Arkose pottery and KKW that replaced local, coarser wares. From the beginning of the EB Age, metal tools such as axes, adzes and chisels replaced similar flint tools. That process was not the direct result of urbanization but involved evolution of metal production during the Chalcolithic period and the development of exchange networks and a probably distinct division of labor in EB I (see Rosen 1996c).

On the basis of the evidence presented in Chapter 6, it seems that during EB II and III metallurgical activities were concentrated at only a few urban sites. Genz, however (2001) explains this in two possible ways. He suggested that

additional information from other centers is unavailable because it has either not been excavated within these sites or metallurgical activity took place in extra-mural locations. He further suggested the possibility that it was associated with smaller, non-urban centers of population that remain unexplored. Such a reality as noted in the former possibilities may differ substantially from arrangements in the preceding EB I period when metallurgical activities were associated with numerous sites.

Dependent upon the alternate scenarios suggested above, methods and networks of distribution may have been quite varied. One possibility is that in EB II–III, urban centers controlled production and distribution of metals. Alternately, they may have only had control of distribution, with indirect control of production associated with a large number of smaller producers that obtained materials from the sources.

The exchange of ceramics in EB III differs from that associated with metal. Postulated, on the basis of KKW, is the existence of several centers of production during EB III. Distribution of this specialized ware suggests decentralized lines of exchange mostly centered in the north, but with some additional evidence of a more southerly distribution. Notably, this is only one ceramic group of the middle EB III period. Unfortunately, we do not have much information about the circulation of other wares in EB III, besides evidence for restricted exchange of DSP pottery, and in general archaeological records indicating exchange are lesser.

In summary, there is a gradual tendency towards centralization and then decentralization of exchange along the chronological trajectory of the EB Age. In EB I the number of commodities is greatest as are the number of exchange networks and centers from which they radiate. By EB II they are significantly reduced in number and probably more centralized. By EB III there appears to be evidence that exchange was lessened and non-centralized.

3. Specialized Commodities

Zaccagnini (1987:58), in his treatment of gift-giving in the Ancient Near East, has proposed the value of a luxury item (that eventually could be a gift-item) to be a combination of its exchange value in the regular way of other standard commodities plus a symbolic connotation attached to the artifact. Only three such types of commodities appear to fit into this category in the EB Age of the southern Levant, ivory objects, carnelian objects and shells.

The three luxury or prestige items or valuables that we can point out among the commodities that circulated during the EB Age are: ivory, shells and carnelian.[2] It appears that ivory bull's heads were paraphernalia directly related to ruling classes (representing palace or temple based institutions during EB II–III). These objects appear to fit the definition of valuables known from written sources of the Ancient Near East of the second millennium BC that

were exchanged within the framework of elite relations between Egypt, Anatolia, Syria and Mesopotamia (Zaccagnini 1987:60). However shells and carnelian beads, presumably of lesser worth and more easily obtainable, appear to have been exchanged within the framework of village societies as early as EB I.

Donkey figurines in this study were not interpreted as a simple commodity, but rather as symbolic objects of a cult involving merchants or people linked with the use of donkeys as means of transportation and beasts of burden. In this sense they can also be called prestige artifacts. According to this suggestion these figurines may have circulated only among these people and were therefore, not objects of exchange in regular networks.

Gifts or objects of special significance of the figurine type are, unfortunately, not sufficiently observable from available data for patterns of exchange to be ascertained with any certainty. However, some likely hints of this type of specialized exchange may be observed from finds of shells from the Red Sea at sites in the Mediterranean coastal plain and vice versa. In addition, some specialized pottery wares may actually have been objects within a system of gift exchanges, although no specific archaeological indicators of such type of exchange can be discerned. Similarly, it is possible to interpret some patterns of exchange of GBW during the EB IA, exchange of part of the pottery southern groups in the Negev during the EB II, and the exchanged pottery of Bab edh-Dhra and Numeira in EB III as examples of gift-giving. However, as in the example of the diamond quoted from Marx in Chapter 2 (n. 4), it is difficult to determine from the physical attributes of a find, if it was considered to be a regular commodity or a valuable.

4. Local Exchange and Merchants

We cannot precisely establish the social existence of middlemen or merchants during the EB Age, though it is probable that they existed as an intermediary social caste. Such status, it appears, would sometimes be related to producers, sometimes independent of them. In all instances, it is suggested they were related to the social classes in power, whoever they were (elites or burgeoning rulers in the EB I, rulers and their administration in EB II–III, etc).

If merchants were part of the communities and settlements where producers resided, they must have been dependent upon the rule of local authorities and upon the ability and willingness of producers of commodities to provision them. If, on the other hand, they resided outside of settlements or centers of production (i.e., in separate locales or were itinerant) they would have been a considerably more independent class. Historical examples of such social classes operating within the parameters of the Ancient Near East appear to be found in such groups as the biblical Kenites, Rechabites and Midianites, or artisans living in the 'Valley of Artificers' of the Persian period (and see Chapter 6,

Section 1). The term ‘Canaanite’ (meaning a stranger; Is. 23:8; Job 40:30; Prov. 31:24), possibly a synonym for trader during the Iron II, may be another example of this class of middlemen.

In instances where exchange was pursued in restricted circuits, as in the example of pottery exchange between Bab edh-Dhra and Numeira during EB III, it was probably accomplished by producers that controlled temper and clay extracted from the vicinity of some sites. Similarly, populations close to sources of raw materials (copper, flint, rocks, bitumen, etc.) or near the sea (for molluscs and fish, for instance), and those possessing a specific technology (as that of the Canaanean blades) would have been involved with specific aspects of exchange. EB II and III urban centers with their large populations could have had their own group of merchants as in the case of Ebla palatial economy of the third millennium BC (Pettinato 1979) or that of second millennium merchants in Ugarit (Rainey 1963). Such likely analogies suggest that the existence of a cult related to donkeys as beasts of burden was related to the existence of a group socially differentiated from the rest of the population by its economic activities, i.e. merchants and/or donkey herders.

The existence of a cult related to donkeys may have a parallel in later periods in the region of the Andean Mountains connected with shamanist practices (Gilead 2002, 2004–2005). Donkey burials (sacrifices?) may have begun as early as EB I, but it seemed to have developed during the EB II and III (e.g. Lod, Tel es-Sakan); however it is not clear if these burials were done within sacred complexes as in Mesopotamia.

Later developments in the region contrast with the EB Age reality, suggesting differences, some substantive but which presage developments in trade. A change seemed to have occurred during the MB Age and onwards when a series of temples have been existed on the Coastal Plains and their internal routes, the Jordan Valley and the Aravah (Kochavi 2004–2005). These temples produced relatively large quantities of imports and they have been probably served as sanctuaries related to trade and exchange with deities that protect the merchants and their economic activities (*idem*). This volume assumes that such types of temples were not present in the EB archaeological records because the inter-regional exchange was not so developed as in the MB Age.

The iconography of donkey figurines, seal impressions and bull’s heads in the EB Age, reflects what Panofsky (1955:27–9) has called artistic motifs and subject matters representing a ‘conventional meaning’ adapted to social, temporal, cultural and geographic backgrounds. We suggest that a significant part of the ‘conventional meanings’ of the iconography of the EB Age allegorizes social groups or social role’s activities represented by animals and icons. Donkeys are representative of exchange, the bull is representative of governorship, while cultic scenes and buildings on seal impressions (i.e., Ben-Tor’s 1978 Classes I and III) are representative of governorship or priesthood. Such iconography reflects a society divided into economic, social and political groups, one in which it may be assumed traders and/or donkey herders

occupied at least a place in the social order.

5. Local Exchange and the Economics of the EB Age

Earlier studies have focused on the effects of political and economic changes during the EB Age in the southern Levant. They have drawn mainly on developments and settlement patterns (de Miroschedji 1989b; Joffe 1991, 1993; Portugali and Gophna 1993; Finkelstein 1995) and information from pottery studies (e.g. Greenberg 2000). For other areas of the Near East (mainly Anatolia and Mesopotamia) some interesting conclusions for the EB Age have been extracted from the archaeological record and from texts. It has been suggested that in the middle of the third millennium BC the circulation of goods of accessible materials previously produced either by households, or by independent specialists, fell under state control. However, by the end of the third millennium BC, when numerous urban centers were abandoned or considerably reduced both in size and population and the number of villages increased (Wilkinson 1990:102–3) there may have been a reversion to less centralized production.

Wattenmaker (1994:197) has pointed out that during times of strong political control, elites were provided with subsistence products by non-elite populations. As noted in Chapter 8, texts from Mesopotamia (Steinkeller 1992), Ebla (Pettinato 1981), and Ugarit (Heltzer 1976, 1978) record movements of animals and agricultural products from countrysides to centers of population. In the area of Lagash the archaeozoological data suggest movements of goods to regional centers during the Early Dynastic period (3rd millennium BC) (Mudar 1982). In Iran at Malyan, during the 2nd millennium BC, animals were probably brought from villages to an urban center (Zeder 1991).

Could these examples have relevancy for the southern Levant during the EB Age? Yes and no. It appears that while some of the features described above are similar to the phenomena that took place in the southern Levant, others are very different. According to the present research, urban centers of the southern Levant register a certain concentration of commodities; however there were no administrative records to explain on which basis these commodities were acquired and circulated.

It is surmised that urban or urbanized centers of sufficient population could benefit from strategic locations between different regions, as in the case of the *metateros* of Central America (see Chapter 5). Arad, near the Hebron Hills and the northern Negev and the Aravah route could reflect just such a case, while the Wadi Feinan area of copper production may be a further case. In addition its location could have allowed it to profit from exchange of tabular scrapers, if as is suspected, the Jafr basin was indeed functioning as a producer of these tools during the EB Age, or if they were contemporaneously produced in the Har Qeren area.

Arad apparently controlled exchange of southern ceramic wares in the Negev during EB II, although Jericho may have been equally influential because of its special situation (e.g. Anati 1962; Dorell 1978). Notably, almost all commodities described in this research are found in Jericho. Authorities of these urban centers could take advantage of traffic of merchants taking tribute for transit through an urban center of population or region under its control, or by means of exchange of commodities (i.e. as intermediaries, perhaps at a point of re-distribution). In all such cases ruling classes would benefit by extracting some of the value from exchange (i.e. surplus) of commodities.

A second form of appropriation of surplus through exchange occurs when authorities have control over an artisan's production as in the case of potters, knappers, smiths, etc. Such workshops could exist within population centers (cf. Ilan 2001) or at smaller settlements. For instance, characteristic pottery wares such as GBW, MW and KKW could have been made at workshops around population centers such as those known at Affula, Tel Dan, Hazor, Bet Yerah and Bet Shean. Flint workshops at Har Haruvim could have been controlled by Megiddo. In the case of Tel Halif it is probable that a secondary workshop could have existed within the EB III city.

A third form considers distribution of ceramic types such as GBW, EC, MW and KKW in which two or more networks are involved. Similar networks of distribution are notable for carnelian objects as well as exotic imports including Nilotic mollusca and fish remains and Egyptian and Egyptianized products.[3] Carnelian was concentrated in two or three zones (Chapter 9, Section 2), while *Chambardia* was distributed throughout the southern Levant (Chapter 8, Section 2).

Although valuables or prestige objects were dispersed in quite different patterns from those observed for utilitarian commodities, nevertheless, their circulation networks may well have been identical. The weight and bulk of prestige items allowed them to be exchanged more easily and over great distances. It is surmised that this was accomplished with extant networks of exchange of utilitarian commodities such as pottery vessels.

Tabular scraper exchange seems to have been a continuation of the Chalcolithic period into the EB Age, while Canaanean blades were distributed through a different system throughout the EB Age. At the same time pottery groups developed and changed in almost each sub-period of the EB Age, with different regional centers of production and different distribution networks coming to the fore.

Domestication of the donkey seemed to be a factor that not only helped with the procurement of raw materials and the exchange of commodities between distant regions, it also must have lowered costs of commodities relative to the Chalcolithic period, prior to the domestication of this beast of burden. Accordingly, if herding and ownership of donkeys was the realm of a restricted group of communities or populations in the EB Age, this factor must have benefited the owners of donkeys or given rise to them.

Of course, rulers of EB communities, whether they represented a village, a town or an urban center, derived economic advantages in the form of the administration of exchanges. It can be suggested that an urban center and its relative wealth was based on profits deriving from the exchange of commodities of other communities passing through its territory. A surplus could only be realized when an 'inequality' occurred in the exchange of commodities as a result of the differences in the division of labor between one community or region with another; i.e. as a result of the differences in the costs of production and transportation of the commodities between different sites or regions.

Archaeological remains from settlements dating to the very end of the EB I through III seem to confirm part of this phenomenon in the existence of public buildings, some of them characterized as palaces, temples or granaries, and fortification systems, e.g. Tel Dan, Hazor, Khirbet ez-Zeraqon, Megiddo, Bet Yerah, 'Ai, Jericho, Tel Yarmuth and Arad (Joffe 1993:82–3; Herzog 1997:42–97).

It appears as if two main types of urban centers existed during the EB II-III *vis-à-vis* exchange systems:

1. Those that took advantage of the sources and had some kind of monopoly on a given production branch (pottery, flint, raw materials, etc).
2. Those that took advantage of their situation near trade routes or passes, acting as intermediary agents between diverse regions.

This work suggests that a lack of written documents indicates the degree of exchange remained at a relatively low level. This was perhaps due to a lack of integration of networks that did not favor exchange in the EB Age of the southern Levant nor allow them to coalesce into a major system as it did in other, more populous regions of the Ancient Near East. Accordingly, unification of medium exchanges was not necessary and the transactions were not recorded.

This situation is reflected in a lack of evidence for the existence of weight-standards and consequently a local system of weights, while metrology seems to have existed as a system of linear measures (de Miroschedji 2001). Crucial for understanding any exchange system is an ability to determine concrete values or information concerning its standard system of weights. Such systems are identifiable in objects and the literature of the Ancient Near East. Legal documents of the Old Babylonian period and the El Amarna Letters offer, amongst other information, testimony to fraud and contamination of precious metals in commercial transactions (Zaccagnini 1976:560) emphasizing the importance of such standards.[4]

In Mesopotamia numerical records existed in the form of tokens prior to the

advent of cuneiform records (Schmandt-Besserat 1983, 1992), but these kind of artifacts have not been found in the southern Levant. By the Uruk period (fourth millennium BC) clay tablets found at Habuba Kabira contained numerical symbols revealing that some aspects of a bureaucratic administration in the Upper Euphrates existed (Akkermans and Schwartz 2003:194, Fig. 6.9).

Of course it can be suggested that a system of accountability existed based on organic (non-surviving) materials, such as the system of *quipus* in the Inca empire (Quilter and Urton 2002) and that writing was not necessary since its invention need not necessarily be related to economic activities (cf. Postgate, Wang and Wilkinson 1995). However, as Egyptian and Mesopotamian sources revealed, numerical and administrative registration forms existed from the 4th millennium BC onward and there is no reason that south Levantine populations in contact with neighboring cultures did not take advantage of such practices as the need arose. It is difficult to understand why, with the knowledge of how to utilize clay for fashioning figurines and pottery fabrication, south Levantines did not use it for record keeping as their neighbors did.

The economic life of the EB Age of the southern Levant was probably at level of exchange of what Pettinato (1979) in his characterization of Ebla called barter or first exchange stage (and see Chapter 1). Urban centers like those of Mesopotamia and Syria exchanged commodities and also utilized weight-measure systems based on metal values. The sole suggestions of administrative local apparatus in the southern Levant are seals and sealing impressions (Beck 1995).

There is no proof for the existence of exchange media such as metals or specific artifacts in the archaeological record of the EB Age of the southern Levant. Furthermore there is no evidence to support the existence of copper ingots as units of measure as they appear in the later IBA. Had they existed, one would expect to have found some evidence for them. Metal hoards are known and appear to be examples of a primitive form of accumulation of values. Flint caches are additional forms, while metals seem to have a more universal character in the production systems (and see Rowlands 1971; Philip 1988).

More important is that there is no indication that land was considered a commodity, i.e. that an exchange of lands existed during the EB Age in the southern Levant as the sales of lands and houses documented in Mesopotamia during the fourth millennium BC (e.g. Gelb 1979:68–73). It has been suggested that land was the main means of production for an economy based on agriculture and that the historic development of land-property went from tribal to royal and sanctuary properties, until private estates. Heltzer (1978:115) has pointed out that the relation between exchange-values of the land and basic commodities will indicate the level of economic development of a country. However, there are other factors that could be involved in the exchange-value as the quantity of population in relation to the cultivated lands, the type of crops cultivated in a given terrain, the geographic characteristics of the

country, or the existence of other natural resources; all these factors determine the relative social costs invested in the cultivation of the lands in relation to other activities.

Interestingly, Runnels (1988) have suggested that trade as a broad regional phenomenon in the EB Age of the Mediterranean was directed towards accumulation of wealth. By contrast to previous periods, exchange in the EB Age was characterized by an increase in scale and in kind, especially by the addition of copper and copper objects as another commodity. The addition of this commodity is rather a qualitative phenomenon and not an addendum of a simple further commodity since metals were a medium of exchange and accumulation. Some accumulation of wealth seems to have occurred as reflected in public (monumental?) buildings of the end of the EB I, the EB II and III, but the conversion of metals into actual exchange media did not come about until after the end of the EB Age.

It is paradoxical that in the ruralized society of the IBA (EB IV), when the urban centers of the EB Age collapsed, copper ingots appear in a standardized mode (e.g. Dever and Tadmor 1976; Cohen 1999:260–5; Segal and Roman 1999) causing Meshorer (1976) to consider them a first means of institutionalized payment.

EB Age economy seems to have been a loosely organized system of exchange networks with little sense of overall control. Different commodities were exchanged as needs arose and there does not appear to have been any visible equilibrium between different branches of the economic life (pottery production, metal production, flint tool production) of even the most sophisticated societies of the era. These aspects appear to have operated as more or less independent networks in which each commodity may be characterized by its own level of development and sophistication, dependent upon region and chronological niche.[5] This low level of integration is a hallmark of EB Age economy in the southern Levant. Accordingly there was no need for a single medium of exchange and it was apparently not developed until the MB Age or later. As economic integration did not exist during the EB Age, political unification did not come about until later periods, after such developments in neighboring areas.

6. Perspectives of Local Exchange in the Southern Levant

The study of local exchange networks of the EB Age has, until relative recent times, been sorely neglected. Indeed, the entire field of research into socio-economic of prehistoric and proto-historic societies of the southern Levant is only newly opened. The present work has tried to blaze a path in this field by collating known data on the EB Age and providing an interpretation for them. Since interpretation can only be as good as the data from which it is drawn and, since the present data base is limited in its scope, the present writer

understand that readers are likely to question and disagree with the interpretations offered in this work. In defense he may only suggest that with further increments in the data base, his interpretations are likely to change, become more complete and engender further debate.

Since the basis for this work is a body of archaeological data with severe limitations, it is important to note that if advances are to be made in understanding exchange in the EB Age, more and better data must be collected and collated. Since quantitative data are important for the understanding of some phenomena, it is desirable that new publications emphasize quantitative data according to precise chrono-stratigraphic provenience. Of course such data must be collected by rigidly controlled and reliable methods.

Future directions for research that are likely to bring about greater understanding of networks of exchange will all for greater understanding of the structure of EB Age economies in relation to them. Petrographic work on more discrete pottery groups could bring is one branch of study that is likely to give useful results. In particular, the petrography of donkey figurines could reveal whether these artifacts were likely to have been made locally or whether they may have originated in one or more workshops.

Additional sampling of basalt objects and determination of their geological sources would provide a real database for study the distribution of these objects. Given present methods, this seems to be a realistic goal. Hopefully, given the present tendency to include specialist studies in excavation reports, information on ground stone tools will indicate what types of raw materials are present in EB assemblages and possibly, their origins may be identifiable. That could lead to some important insights into patterns of exchange.

The search for a method that could identify flint origins for the Canaanean industry and the tabular scrapers is certainly a laudable direction that may well benefit archaeologists understanding of exchange patterns. In particular, excavation of the workshop site of Har Haruvim combined with such studies could provide major insights into the essence of a production center for these specialized tools. That in turn could offer further insights into patterns of their distribution.

Finally, it is hoped that more theoretical work, combined with the use of analogies derived from ethnoarchaeology will be applied to study of the EB Age in general, and particular to its economic aspects that are so tied to networks of exchange. It behooves field archaeologists to further develop field strategies that will allow for collection of wide ranges of data that can also be utilized by other social scientists for studies that will augment more traditional archaeological approaches. From such work it would be possible to derive insights that could be applied to the study of additional periods and regions.

7. Perspectives of Early Bronze Age Economics and Exchange

Worldwide

The development of EB communities produced subsistence-based demands that could not be met by individual communities of the southern Levant. This, in turn, led to a need for exchange of commodities between different regions and settlements. Objects exchanged included not only basic commodities but also prestige and luxury goods.

Expressed in Marxist terms, the exchange of commodities became a prerequisite for continuing production and reproduction of material conditions necessary for subsistence (Marx 1993:471–9). As we suggested before, the EB urban centers that arose in the southern Levant controlled part of this exchange between sites and regions, and thus these centers acquired part of the surplus of the communities that exchanged products between them.

If our conclusions concerning the EB economics of the southern Levant are correct, circulation of commodities in early urban societies may have led to what Earle (2002) calls 'staple finance systems'; however, the prerequisite to understanding this system is to define which mode of production existed during the EB.

It has been suggested that the link between all the societies of the EB Age is their organization as complex chiefdoms and/or early states. In the words of Earle (idem), these entities emphasized agricultural intensification, redistribution, prestige-goods exchange, political warfare and ideology, all of which would fall under the rubric of political economy. As opposed to Earle, who, as a processual archaeologist was interested in understanding the general features of human behavior and practices evolving over time, this work attempts to understand human behavioral change from the material conditions of production and exchange of human products.

Staples are critical to the survival of individuals/households, but generally have high transport costs and can be stored for only limited amounts of time. Objects of wealth, often convertible in terms of staples, are more easily transported and stored. Both are significant components of all archaic states.

Within this scenario, increasing wealth also encouraged additional agricultural intensification in order to support the associated costs of acquiring valuables. Primarily, the accumulation of wealth was accomplished in contexts that were more and more distant from the locations where production occurred.

All this activity involved a great deal of human labor. While there was probably no specific intent to create surplus (for purposes of exchange), as there is in modern capitalist societies on an industrial scale, nevertheless, the effect was similar. Surplus products were created, either for domestic use, for the use of the community or for a central political power controlling exchanges. There is an important distinction between the portion of labor directly consumed by its producers and their families, and the products of labor that serve to satisfy general needs (which is, by definition, the result of surplus

labor), however they are distributed (Marx 1977b).

State or community control over production and distribution of goods was conducted under conditions of limited exchange or barter. This control was conducted within a mode of production in which appropriation of labor occurred through the power that had authority over all the communities (as the communities had power over the individual members), as the highest or sole proprietor. In this framework, commodities could circulate, although in a limited way.

In this limited way, however, some economic forms of craft specialization developed, with specialists making their appearance in the period of transition to the archaic state, such as merchants or types of entrepreneurs. Some time ago, Gordon Childe (1930) pointed out that metallurgy as a more complicated technique carried out by specialists, implied the birth of a segment of specialists, probably full time craftsmen. This phenomenon could result in specialization within the economy and the multiplication of commodity production. The increase of craft specialization and the concentration of labor in the hands of the so-called 'great organizations' (palace and temple), gave birth to the label 'urban revolution'. This is what distinguished urban centers from villages (Liverani 2005:110–11).

This process did not follow the same pattern throughout the various regions of the ancient Near East, such as the developed centers in Mesopotamia, Syria and Egypt, and the peripheral, less-developed regions such as the southern Levant. In addition, it can be suggested that in regions where economic integration did not exist, political unification did not arise, while in developed centers such as those above mentioned, economic improvement and integration was followed by political unification in one form or another.

The study of local exchange during the EB Age of the southern Levant reveals a society of scattered localities with an economy based on the bartering of commodities, which has not yet developed even media of exchange. These developments only appear in later periods in this region.

Notes

1. A similar observation may be made concerning the appearance of Nilotic shells in association with Egyptian pottery. That subject, concerning exchange with external regions is however, beyond the scope of this study.

2. Other valuables such as bed models (Beck 1995), decorated bones (Zarrzecki-Peleg 1994) and alabaster objects (Amiran 1970) have not been considered in this research since there is no clear information on their provenances or they are Egyptian imports.

3. Egyptian and Egyptianized pottery is primarily found in the Southern Coastal Plain and the Shephelah and rarely in the north, although exceptions may be found at Megiddo (Ilan and Goren 2003).

4. The *topos* of the merchant that complicates himself with weights in order to cheat appears not only in the Mesopotamian literature (Lambert 1960:132–3; Finet 1973:70, §

P) but also in the Biblical sources (Lv. 19:35; Dt. 25:13-16; Am. 8:5).

5. For a so-called law of uneven and combined development in history see Novack 1974.

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